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Survey of fish consumption in Madras

BOBP For Fisheries Development
BAY OF BENGAL PROGRAMME

ODA

SURVEY OF FISH CONSUMPTION IN MADRAS

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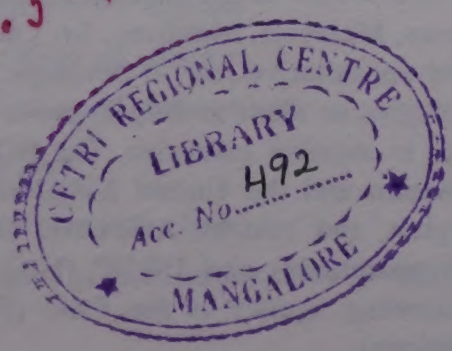

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Fish occupies an important position in the diet of much of the population living in the Bay of Bengal region. It is the most favoured and least expensive form of animal protein available. But poor post-harvest techniques can cause substantial material and nutritional losses of fish. Most commonly, bad handling of fish upon capture leads to rapid spoilage and inevitable downgradation in value. Subsequent poor, or inadequate, processing, marketing and distribution practices tend, in turn, to lead to low-quality products with low market values.

It was against this backdrop that the ODA-funded Post-Harvest Fisheries Project of the Bay of Bengal Programme (BOBP) sought to examine the consumption of marine produce and the extent of current wastage. More specifically, it sought to assess what determined the demand for marine produce — rational considerations or attitudinal aspects or both. It was decided to confine such a study to Madras, the capital of the state of Tamil Nadu, India, in the first instance, but felt it could later be extended to other cities. The underlying reason for studying the market in Madras was that the demand for fish in this metropolis was felt to be considerably low *vis-a-vis* the availability.

To this end, MARG, a leading marketing and research group, was engaged to conduct exploratory research in Madras and study the consumption and attitudes to consumption of marine produce in households in the city. This document not only comprises a report of the findings by MARG during its study, but it also presents a Foreword indicating possible future interventions in the clearly important area of fish marketing. Both the study and the working paper on its findings were funded by the Overseas Development Administration of the United Kingdom.

The Bay of Bengal Programme (BOBP) is a multi-agency regional fisheries programme which covers seven countries around the Bay of Bengal — Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. The Programme plays a catalytic and consultative role: it develops, demonstrates and promotes new techniques, technologies or ideas to help improve the conditions of small-scale fisherfolk communities in member countries. The BOBP is sponsored by the governments of Denmark, Sweden and the United Kingdom, by member-governments in the Bay of Bengal region, and also by AGFUND (Arab Gulf Fund for United Nations Development Organizations) and UNDP (United Nations Development Programme). The main executing agency is the FAO (Food and Agriculture Organization of the United Nations).

This document is a working paper and has not been cleared by the Governments concerned or the FAO.

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FOREWORD

by Tim Bostock[1]

The consumer is arguably the main determinant of the quality, quantity and diversity of fish supplied to his particular market: because the Bengalis favour freshwater fish, their markets are full of it; as the Tamils have a penchant for Bream, their markets supply them with it, and so on, in reflection of the wide variation in consumer needs. Just how immutable are these needs? Can they be changed to the benefit of both producer and consumer alike?

Indian consumers may well be conservative by nature in their fish eating habits, but it is clear that certain influences can be brought to bear on their traditional consumption patterns. Changes may arise either as a result of **internal** factors, such as varying income levels and social status, or due to **external** factors, such as a reduction in the supply of traditional varieties to markets. The latter, often attributable to the absence of controls on fish extraction, may lead to price increases to which the consumer may respond by selecting other species which she perceives as satisfying similar needs.

Whereas these influences may lead to vague and uncontrolled drifts in consumption patterns, others, such as active **market promotion**, can play a significant role in actually inducing change. The extent to which this can be achieved should be of great interest to development planners, policy makers and the trade in general, because significant social, political and economic benefits could accrue to those who achieve success. The potential outcomes of controlled drifts in both production and marketing sectors is also of particular interest to fisheries strategists wishing to identify ways of improving fish supplies in more sustainable and cost-effective ways.

Why should we wish to induce changes at this time? The overriding consideration is that, with an ever-increasing population, the demand for fish is rapidly growing. Productivity is, however, relentlessly declining, particularly in the inshore waters, due to both a stark absence of coastal fisheries management and considerable post-harvest loss. This scenario raises several questions:

— To what extent is current demand already being satisfied?

— What prospects are there of satisfying an increasing demand, either from existing production, through more efficient marketing, or from new areas or new species?

— Who is actually eating fish now and how important is it in their diet and who will be eating fish in the future?

— To what extent are consumer attitudes towards fish consumption currently determined by parameters such as quality, price, availability or hygiene at point of sale?

— What kind of promotion and key influences could be brought to bear on consumers which may assist productivity, reduce competition for the most popular species and help to decrease the pressure on the inshore fishery?

As a first step towards anwering some of these questions, the Bay of Bengal Programme (BOBP), through its ODA-funded Post-Harvest Project, undertook, in coordination with the Marketing and Research Group (MARG), a piece of exploratory consumer market research in Madras, Tamil Nadu, India. The results of this research are presented and examined in detail in this publication.

The research has shown that fish is very highly regarded by the vast majority of the Madras population and across all income groups. It is a very important source of protein, especially amongst the poorer sections. Even so, overall consumption is low. Besides corresponding to the

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[1] Post-Harvest Fisheries Adviser, ODA/BOBP

[2] All fish names used in the report are the 'English' names popularly used in Madras. See Appendix I, for Scientific, Tamil and general English names.

typical dietary habits of South India, where consumption of animal protein is low anyway, the reasons which may further limit consumption include: poor hygiene and sanitation at the market outlet, the variability in freshness of the fish which is sometimes subjected to poor post-harvest handling, the limited acceptance of a wider range of species and products in spite of a good knowledge of those available. That there is an underlying trend towards greater meat and fish consumption is of great significance. With population growth, this will place an even heavier burden on the fishery and fish trade, which are already groaning under the effort and suffering through lack of investment.

Can the findings of the research help us address the problem of how to augment supplies of fish to an ever-growing population in the face of dwindling coastal stocks? Some potential solutions suggested by the study may be:

— To address the existing marketing constraints both through the development of improved wholesale and retail facilities and through provision of advice and support in fish handling to those involved in fish trading, especially at the small-scale level. This would help increase the throughput and efficiency of the marketing operation, reduce loss, optimize incomes for the producers and simply make the most of what is already there. Great care would need to be taken to ensure that any improvements were cost-effective to the beneficiary while, at the same time, maintaining the affordability of the product. This is especially important with the lower income groups.

— To take a closer look at new or non-traditional varieties of fish which are currently in low demand, wasted or under-exploited. Perhaps in the not too distant future, and with a strong promotional effort, Skipjack, Tuna or Bonito could become as important in the diet of the Tamils as they are in Sri Lanka and as they are becoming in Kerala. It is not unreasonable to assume that if some of the fishing effort currently concentrated on the few traditionally accepted species is diverted toward others, this would indirectly have a positive effect in improving the management of the former. This effect may further be emphasized by the use of more selective fishing gear and corresponding reduction in by-catch.

— To assess the potential of fresh and brackishwater aquaculture to provide greater quantities of fish for local markets.

— To promote awareness of the positive health aspects of fish consumption amongst the poorest socio-economic groups and dispel some of the myths and taboos about fish consumption.

The question arises as to who should implement these improvements and promotional strategies based on ongoing market research. Chicken, eggs, milk and several other protein food not only have more centralized and organized production and distribution systems, but also have their own promotional organizations — such as the Egg Produce Association of India, the Poultry Producers' Association, the Milk Marketing Board etc. However, no such centralized body exists to support the domestic fish marketing sector, which comprises a large number of unorganized small-scale operators.

Such a body could indeed play a major future role in improving fish marketing in India, just as similar organizations have already done so, and are now doing, in other countries. Its strategy, however, would need to be highly sensitive to the diverse consumer needs. For example, considering the crucial role that low value fish plays in the diet of the poor, some of the technical interventions aimed at quality improvement, which are commonplace in other countries, simply may not be financially viable options in India.

Further market research aimed at assessing consumer and trade needs and evaluating potential responses can certainly play a crucial role in the development and eventual implementation of such strategies.

THE SURVEY IN BRIEF

I. OBJECTIVES

The Bay of Bengal Programme, through its ODA-funded Post-Harvest Fisheries Project, undertook in 1991, in coordination with the Marketing and Research Group (MARG), Madras, India, a piece of exploratory consumer market research, the major objectives of which were:

- **to investigate the consumer's attitudes to fish in terms of the critical needs met by fish *vis-a-vis* other types of food, the factors motivating and deterring the consumption of fish, and the consumer's perceptions of fish;**

- **to examine current purchase and usage habits, more specifically in relation to the selection of fish, the assessment of its quality, the outlets where it is bought, the types of fish available and preparation practices; and**

- **to identify need-gaps or perceived problems, if any, in relation to awareness, availability, freshness, quality, packaging and processing.**

Given useful results, similar studies could be commissioned in other consumer centres in the BOB region, from which marketing strategies to meet consumer demand could be evolved and, simultaneously, help could be offered for the development and management of fisheries.

The research was carried out in two distinct but contiguous phases: first, **a quantitative study based on a questionnaire** given to 2,527 Madras households which was used to gather primary data on the following:

- consumption of high protein foods;

- consumption of fish/fish products; and

- purchasing patterns of fish/fish products.

Second, **a qualitative, focus-group research study**.

The data gathered were classified by several factors, but primarily by monthly household income.

II. METHODS

Quantitative study

GEOGRAPHICAL COVERAGE

The study covered only the Madras Urban Agglomeration, Tamil Nadu, India.

TARGET RESPONDENT

The target respondents for the study were essentially in two categories:

- Housewife in **ALL** households;

- In a household where fish was not consumed, or if it was a vegetarian household, an additional member of the household, randomly selected from the over-15s.

SAMPLE SIZE AND SELECTION

A total of 2,500 interviews were proposed across the entire city and across all categories of respondents. Against this, a total of 2,527 interviews were achieved.

A total of 322 starting points were selected in Madras, of which 226 were in the urban area and 96 in the urban agglomeration. Around each starting point about seven or eight contacts were made using the Right Hand Rule, that is, by using the random walk method which eliminates interviewer bias in selection of a household.

In non-vegetarian households where fish/fish products were not consumed in the household and in vegetarian households, all members of the household were listed in ascending order of age and a respondent, apart from the housewife, selected using the Random Selection Grid, thus ensuring elimination of interviewer bias in respondent selection. The selected respondent was then interviewed to determine the incidence of individual consumption of fish, if any, in such households.

QUESTIONNAIRE

The questionnaire (available on request from BOBP/ODA, Madras) was finalized in consultation with the Post-Harvest Project of the Bay of Bengal Programme after an initial pilot study. The questionnaire was mainly structured and took about 15-20 minutes to go through.

FIELDWORK

All interviews were conducted by interviewers from MARG's General Field Force, under the overall control and supervision of MARG's South Zone Field Controller. All interviewers were briefed by a MARG Research Executive.

ANALYSIS

All analysis of consumption of fish has essentially been done by income, location and category of household.

Throughout the report an attempt has been made to include only data which clearly demonstrates statistically significant trends and differences. However, in order to avoid confusion, significance levels have not been indicated. This information may be obtained from the Post Harvest Fisheries Project in the Bay of Bengal Programme.

All data have been weighted by income and projected to the total households in Madras U.A., namely 1,027,000. This has essentially been done on the basis of National Readership Survey-IV, Distribution of Households by Income (NRS-IV is based on the 1991 Census), which is as follows:

	No. of households ('000s)
Below Rs.500	280
Rs.501-Rs.1,000	279
Rs.1,001-Rs.2,000	239
Rs.2,001-Rs.4,000	165
Rs.4,001 and above	64
Total	1,027

Qualitative Analysis

GROUP SELECTION

Ten group discussions were conducted in Madras. The group composition is given below :

Category	*Age group (yrs)*	*Monthly household income (IRs)**	*Consumption*
Housewives	25-40	Below 500	Light+medium consumers
Housewives	25-40	Below 500	Medium+heavy consumers
Housewives	25-40	501-1000	Light+medium consumers
Housewives	25-40	501-1000	Medium+heavy consumers
Housewives	25-40	1001-2000	Light+medium consumers
Housewives	25-40	1001-2000	Medium+heavy consumers
Housewives	25-40	2001-4000	Light+medium consumers
Main Earners	25-40	2001-4000	Medium+heavy consumers
Housewives	25-40	4000-plus	Medium+heavy consumers
Main Earners	25-40	4000-plus	Light+medium consumers

The definition of 'light consumers' was those consuming less than 1 kg of fish in a month; 'medium' those consuming 1-2 kg in a month; and 'heavy' those consuming more than 2 kg in a month.

All consumers were selected from the Madras Urban Agglomeration.

Respondents were recruited by means of a carefully designed recruitment questionnaire and those eligible were invited for the group discussions. All group discussions were conducted by the MARG executive handling the research project and were tape-recorded.

STIMULI USED

On the basis of certain hypotheses made prior to the research, a few stimuli were used. These hypotheses were :

— Consumers are indifferent to freshness, quality and hygiene standards in the purchase of fish; and

— Fish is the only non-vegetarian food that has been given little marketing support, in the real sense of the term.

Samples of good quality dried fish, and samples of iced Seer and Pomfret in varying degrees of freshness, were, therefore, used as stimuli. In addition, photographs of different types of fish outlets were also shown to a few groups. Further, in order to elicit reactions to the concept of packaged fish, a few packs of fish from the U.K. were shown to middle and upper income consumers.

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* US $ 1 = I Rs 27 appx. (latter half of 1991)

III. MANAGEMENT SUMMARY

General conclusions

The research clearly indicates that fish is a highly appreciated food in all income groups due to its easy availability, affordable price, taste and nutritive value. Consumers with low and middle incomes perceive fish as one of the cheapest forms of adding value to their food intake. It is perceived as the only non-vegetarian food which combines taste, nutrition and easy digestibility as well as affordability. There is high awareness of the various types of fish as well as of their distinctive tastes and values.

Analysis and interpretation of consumer perceptions also reveal that there is immense scope for improvement in certain areas in making fish available.

The study concludes that there are few barriers to the consumption of fish. This is indicated by the somewhat surprising fact that the incidence of consumption of fish/fish products is as high as 91 per cent in the households surveyed. Only 2 per cent of the households consume other non-vegetarian food and no fish, while 7 per cent of the households are vegetarian.

The incidence of consumption of fish/fish products is almost universal in the lower income groups and decreases with increasing income (see Figure 1). This is accounted for by the increasing proportion of vegetarians with increasing income. Significant, however, is the higher incidence of fish consumption in households with housewives in the lower age group. This, combined with the fact that 23 per cent of Brahmin households consume fish/fish products, could suggest an increasing tendency to consume fish/fish products in the future in households not doing so at present.

Fish vs *other animal protein foods*

Amongst the protein items studied — milk, eggs, chicken, mutton, fish/fish products and other meats — eggs and fish/fish products have the highest incidence of consumption (91 per cent), followed by mutton (81 per cent) and milk (76 per cent). Chicken is consumed by 66 per cent of the population. Not surprisingly, eggs, with a low per unit cost and easy availability, are a high consumption item in all income groups. Milk, on the other hand, which involves a fixed, one-time down-payment for regular supply, has a near universal consumption in the upper income groups, but very low consumption in the lower income groups.

These findings indicate that a major role is played by **price** in the consumption of food items. In the light of this, it would be pertinent to note that households with monthly incomes upto Rs.2,000/month spend, on an average, over three-fourths of their income on food items. Though this proportion comes down with increasing income, it is, on an average, as high as 40 per cent even in households with monthly household incomes of over Rs.4,000.

Expenditure and consumption

Though the consumption of fish and eggs is the highest, the average monthly expenditure across all households is the highest on milk (Rs.92), followed by fish (Rs.68), mutton (Rs.55), chicken (Rs.36) and eggs (Rs.27) — again emphasizing the low unit cost of eggs.

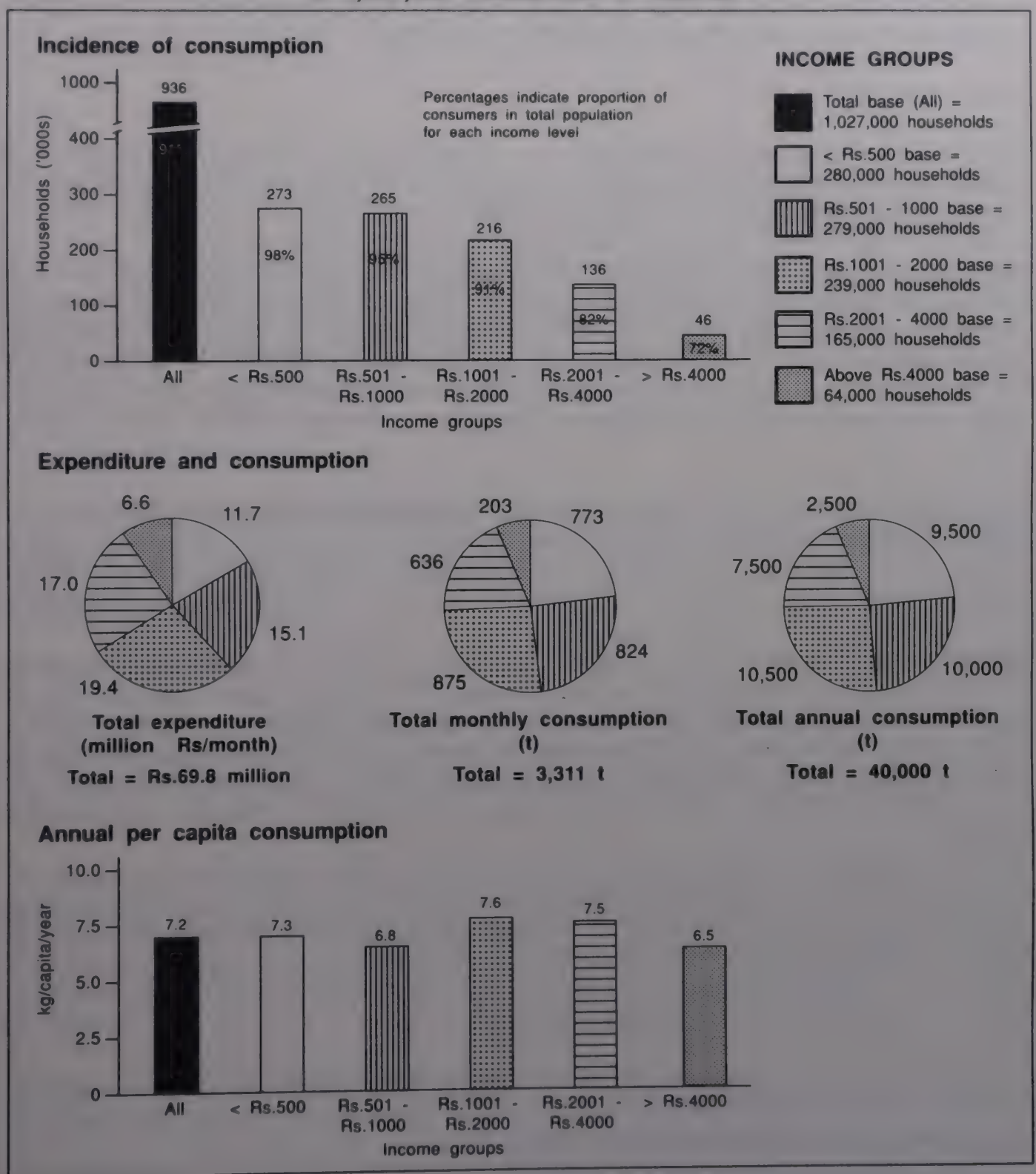
In households consuming fish/fish products, the amount spent per month on fish/fish products varies by income — Rs.43 in the below Rs.500 income to Rs.144 in the Rs.4,000 and above income group. The variation in quantity is not much — from about 3 kg in the former groups to about 5 kg in the latter. This would suggest that more expensive products are consumed in the upper income group and less expensive products in the lower income group. This also indicates the availability of a variety of fish/fish products to suit individual household budgets.

The annual *per capita* consumption of fish for all groups is more than three times that of mutton or chicken — 7.2 kg *vs* 2.4 kg. However, despite an almost universal incidence of fish consumption

in the below Rs.500 and Rs.501-1,000 income groups, 56 per cent and 52 per cent of households respectively consume less than 2 kg/month (equivalent to about 4.8 kg/capita/year), indicating scope for increasing consumption in this category. The average annual per capita consumption of fish for these groups would be about 7 kg. It should, however, be remembered that all estimations are, at best, approximations, as fish is, by and large, sold in heaps and not by weight.

An overall summary of the total expenditure and consumption of fish/fish products across all households is given in Figure 1.

Fig 1. Indicative consumption of, and expenditure on, fish and fish products in 1,027,000 households in Madras



Attributes

Fish/fish products are generally perceived to be **better for health**, to give more **value for money**, to be more **tasty**, **easier to cook** and more **easily available** than mutton or chicken. The only factor on which it scores below the other two is on **ease of cleaning** and this could well reduce the quantity of fish consumed.

Major reasons for eating fish/fish products are essentially **taste** and **economy**, with economy obviously playing a major role only in the lower income group. **Nutrition** and **health** are more emphasized in the upper income group.

Fish product type

Amongst fish/fish products available, seawater fish is consumed universally. This is followed by the consumption of dried fish (83 per cent), shrimp (68 per cent) and crab (60 per cent). The consumption of shrimp is higher in the upper income groups and that of dried fish in the lower income groups, while that of crab is spread across all income groups. Crab is obviously a delicacy available at reasonable prices, but it may not be available at all times or easily prepared, which is perhaps why only a 60 per cent consumption is recorded.

Freshwater fish

The incidence of consumption of freshwater fish is only 20 per cent. However, the popularity of 'Golden Fish' (a farmed Tilapia) amongst consumers would suggest there is a major role for marketing in promoting a specific variety of fish.

A lot of consumers appear not to be very familiar with the taste and nutritive value of freshwater fish; this is, perhaps, due to locational constraints. However, with marketing and advertising support as well as branding of freshwater fish, under the 'Golden Fish' banner, many consumers, even in the low income groups, have been induced to try it. It is not only felt that it added variety in consumption but also offered status benefits that fish, as a category, lamentably lacks. Consumer willingness to experiment indicates that promotion of freshwater cultured fish has a lot of scope.

The greatest benefit associated with this category is that freshness is assured and that there is no fear of compromising on freshness as in marine fish.

Dried fish

Despite the fact that dried fish is liked by all consumers, both in terms of taste as well as convenience, there is a certain degree of embarrassment in admitting it. This is partly because of the poor status value associated with its consumption and partly because of practical difficulties, *viz.* the strong and unpleasant smell, excessive salt content, poor quality etc. Therefore there is a need to make available good quality dried fish, either loose or in functional packaging. Status value could be enhanced by popularising the expensive varieties of dried fish, *viz.* Seer and Seaperch.

Improvement in quality should also take care of current perceptions relating to the ill-effects that dried fish have on the consumer's health. Education pertaining to the handling and preparation of dried fish would enhance the consumer's interest in the product.

Awareness and preferences for seawater fish

Awareness of the varieties of seawater fish is very high. However, purchase and consumption is restricted to specific species in specific income groups. Bream is the only variety whose consumption is common across all income groups.

The varieties consumed in the lower income group are: Whitefish, Anchovy, Mackerel, Sardine and Goatfish. The varieties consumed in the upper income group are Seer, Pomfret, Shark and Seaperch. Whitefish and Anchovy are also consumed to some extent in the upper income groups.

Awareness is over 50 per cent for at least 17 varieties of fish. Catfish, Ribbonfish, Horse mackerel (Catangids), Indian salmon (Polynemids) and Sole/Flatfish are varieties with over 50 per cent awareness, but are little purchased (14-29 per cent).

Ray, Eel, Jewfish (Sciaenids) and Tuna have an awareness ranging from 27 to 45 per cent, but purchase is only 4-7 per cent, indicating a very specific preference for certain varieties.

The most preferred fish are the Bream and Seer. Again, the major reason for preferring any specific variety is **taste**. This is followed by **economy** in the lower income group and **fewer bones** in the upper income group.

Less popular species

Though consumers are aware of a wide range of species, they state that they prefer to confine themselves to familiar and popular species. Therefore, they feel, if there is some dependable and authoritative source from which they could learn about the characteristics of the other species, a much wider variety would then become available to them.

Status

Another interesting factor is that of the status associated with fish consumption; it is very low compared with other protein foods. Amongst the fish species, some (such as Seer) are, as expected, more status enhancing than others. The extent to which the status image of fish in general could be enhanced through promotion of its health aspects is likely to be considerable. For example, Shark, a variety which appears to have gained popularity over the last few years, is associated with good taste, lack of bones, availability, high nutritional benefit as well as several anecdotal medical benefits. Promotion of Shark and other under-exploited resources, such as Tuna, could lead to additional supplies of high quality fish to the growing markets.

Frequency of purchase

The varieties preferred are bought at least once or twice a month. On each occasion, the average quantity bought is 250-500 g. Based on the quantities consumed, it could be said that the two most popular varieties, Bream and Seer, together account for at least 20 per cent of the fish/fish products consumed in Madras.

Form of preparation

The curry and the fried form are the preferred preparations. The curry is more popular in the lower income group, suggesting a substitution of *dal* (lentils) and vegetables with fish. The fried form is preferred more in the upper income groups. The shark is the only fish which is usually steamed and tempered.

Overall, the research reveals, consumers lay more emphasis on enhancing and ensuring taste while preparing fish dishes. There is no felt need to retain the nutritive value of fish during cooking or after. Also, consumers are not sure about the supplementary foods that need to be cooked while preparing fish. Further, fish recipes are felt to be fewer compared to other non-vegetarian foods. Hence, tips offered by an agency to add variety, improve taste and retain nutritive value would be welcome.

Fish products and packing

The research indicates quite clearly that the market is not yet ready to accept processed or packaged food in its strictest sense. However, fish fillets, and fish products which are nearer-to-basic in form and yet offer convenience and quality, could be offered on an experimental basis. Fish pickles, fish chips, dried fish and dehydrated fish have potential if marketed by a company of repute. Frozen fish is another product that attracts the interest of upper income consumers. These consumers are also willing to pay a premium for accessibility, hygienic packaging and cleaning, all of which stand in the way of more frequent consumption. Branding could also enhance status value, and the promotion of the 'tasty' and 'nutritious' image of the product would help stimulate interest by this group.

Purchasing decision

The decision on the variety of fish to be purchased and the actual purchase are both done by the housewife. However, the incidence of purchase by housewives drops with increasing income and is only about 50 per cent in households with incomes over Rs. 4,000. Correspondingly, purchase of fish by the chief wage earner is more prevalent in the upper income group (20-24 per cent).

The role of others, possibly domestic help, also increases with increasing income. This phenomenon is possibly what leads the upper income groups to pre-decide on the variety before purchase, unlike in the other income groups where the variety is decided on after seeing availability and freshness. In about half to two-thirds of the pre-decided cases, the variety decided on was not available and half of those who did not find the variety returned without purchasing any alternative variety. This would, therefore, suggest a need for marketing of fish/fish products in places accessible to the housewife in these income groups.

Point of purchase

Fish is at present purchased from vendors who bring it home in the case of 20 per cent of the households consuming fish. This proportion is higher in the lower income group, indicating a regular demand for the product from this class. Almost all the others buy their fish in their own locality — within a radius of less than one km. Only a discriminating 4 per cent in the lower income group and 8 per cent in the upper income groups go to places beyond 2 km — possibly to special markets for fish/fish products.

Consumers are generally not very happy with the government fisheries stalls. The need to have a wider variety, especially of the inexpensive species, greater accessibility, better locations, more affordable prices and more helpful and friendly assistants at the government fisheries stalls are highlighted by consumers. In addition, there should be advertising efforts to motivate consumers to visit these stalls more often.

Freshness at retail

Consumers unequivocally hold that freshness is extremely important and is the overriding factor in influencing purchase. The consumers' understanding of what constitutes freshness was, surprisingly, similar across all income groups.

As distinct from 'freshness', all consumers agree that 'fresh fish' is that which has not been kept on ice and, as such, is almost never available. The use of ice to keep fish fresh prior to sale appears to be commonly understood and this fact tends to dispel the myth that many retailers have about the negative association that the consumer has with fish sold on ice. Clearly the retailer is making an attempt to sell his fish on a 'fresh' ticket, assuming that the consumer is being duped! Several mentions of retail malpractices aimed at false enhancement of 'fresh' appearance were mentioned. These include use of red dye on the gills; addition of beach sand; mixing bad fish with good; and even stuffing fish to enhance weight. This kind of consumer/trader mistrust may not be widespread, but could nevertheless be removed to some extent by promoting improved handling through a more extensive use of ice in fish marketing.

Hygiene at outlets

The research indicates that despite the insensitivity of the majority of consumers to the poor hygiene conditions at outlets, this is an area that needs greater attention. As the fish will be 'cleaned' at home, it would appear that lower income consumer groups are prepared to put up with dirty markets in order, they believe, to keep prices competitive. This attitude is quite understandable, given the low levels of income of most of the respondents. However, the inherent public health hazard represents a significant, yet unquantifiable, threat to the population. The middle and high income market segments do indeed recognize this problem as critical and tend to avoid dirty

markets or, at least, if able, send servants to make the purchases. Health risks, such as diarrhoea, associated with consuming fish, are recognized as important factors inhibiting fish consumption and tend to work against the already well-established health advantages. It is clear that cleaner market facilities may attract more customers as long as prices remain unaffected. Middle/upper income groups would even pay a premium for better shopping comfort. Moreover, education about the ill-effects of poor hygiene at outlets would convince consumers about this need.

IV. CONCLUSIONS

There appear to be few barriers to consumption of fish/fish products in households. On the contrary, there is tremendous potential to increase the quantity of consumption of fish in all households. There would also appear to be an increasing tendency within the population towards fish consumption.

In the lower income groups, just over 50 per cent consume less than 5 kg/capita/year only and consumption could be increased, probably by emphasizing to this income group the nutritional and health benefits of fish consumption in general.

In the upper income groups, the consumption of fish with **fewer bones**, *i.e.* the varieties preferred by them, could be increased through simple product development focussing on improved convenience, *e.g.* pre-cleaning, enhanced quality and packaging, and by better marketing and distribution. However, the **taste** factor should always be maintained.

Fish on ice in a local market

DETAILED COMMENTARY

Consumers buying fish at the model Besant Nagar fish market

PART A

FISH CONSUMPTION:
FINDINGS OF QUANTITATIVE RESEARCH

1. THE SAMPLE

The research was carried out from 12.7.91 to 3.8.91 using the methodology already outlined in Section II. The following sections (1.1 to 1.3) describe and classify the sample by several different variables and indicate the incidence of consumption of high protein foods by income and occupational groupings.

1.1 *Classification of households in Madras city*

Respondents were asked about their regular consumption of fish and fish products as well as of chicken, mutton, eggs, milk etc. On the basis of their answers they were classified as:

(i) Households consuming fish and fish products and other non-vegetarian food items.

(ii) Households consuming non-vegetarian food items, but not consuming fish.

(iii) Vegetarian households consuming milk and eggs only.

It was found that of the households in the Madras Urban Agglomeration, 91 per cent are non-vegetarian consuming fish, 2 per cent are non-vegetarian, not consuming fish, and 7 per cent are vegetarian consuming only milk and eggs. However, analysis by income indicates an increase in

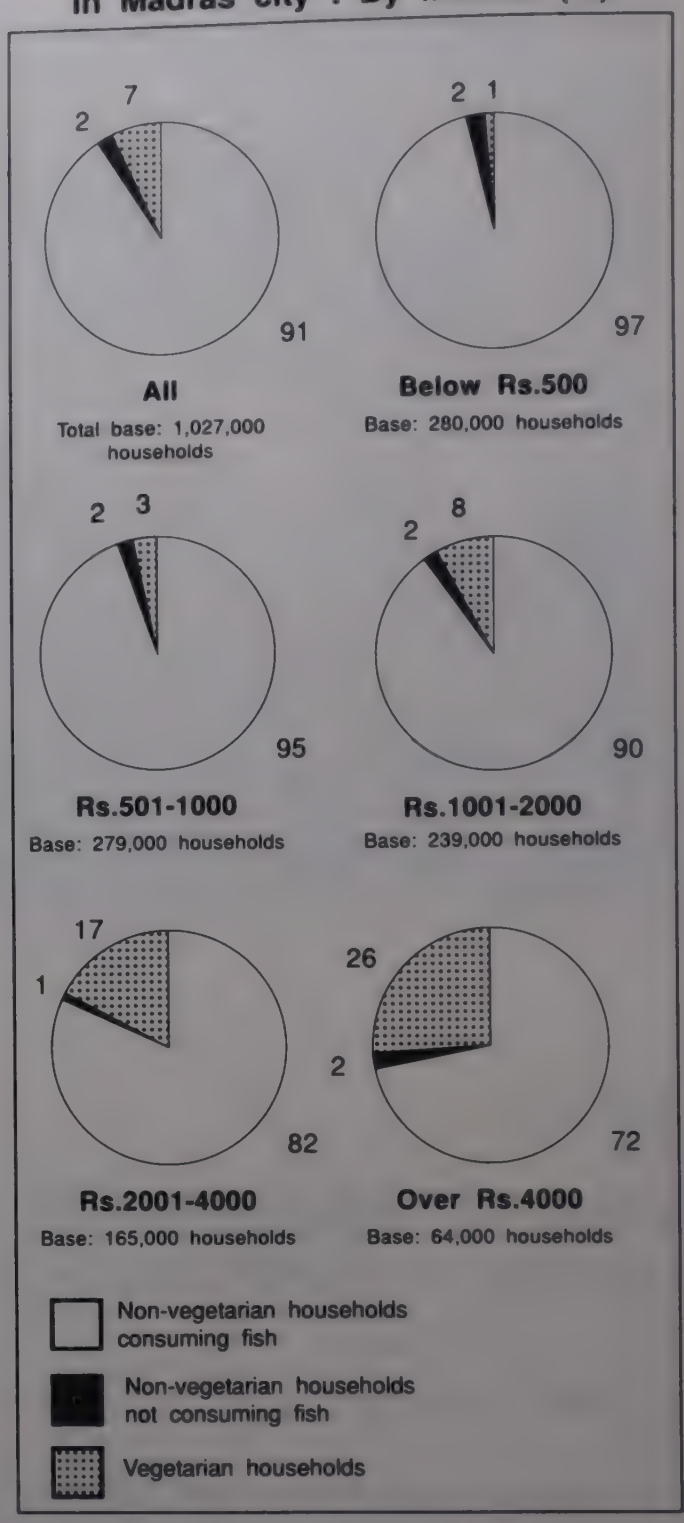
vegetarians with income, with 17 per cent and 26 per cent of them being among those in the Rs 2001-4000 and over Rs 4000 income groups respectively (see Figure 2).

Analysis of households by the age of the housewife indicates an increase in consumption of fish in the lower age group. This, together with the fact that about 23 per cent of Brahmin households, traditionally strictly vegetarian, consume fish, could possibly suggest an increasing tendency to eat fish/meat etc. even in traditionally vegetarian households (see Figure 3).

Analysis by location indicates a marginally higher incidence of consumption of fish and fewer vegetarians in central Madras (see Figure 4).

The vegetarians are more amongst teachers/professors (34 per cent) and officers/executives (20 per cent) (see Figure 5).

Fig 2. Classification of households in Madras city : By income (%)



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* Readers wishing to obtain additional information or data not presented in the figures/tables in Part A of this report may obtain them by applying to the Post-Harvest Fisheries Project, Bay of Bengal Programme Office, 91 St. Mary's Road, Abhiramapuram, Madras 600 018.

Fig 3. Classification of households in Madras city : By age of housewife (%)

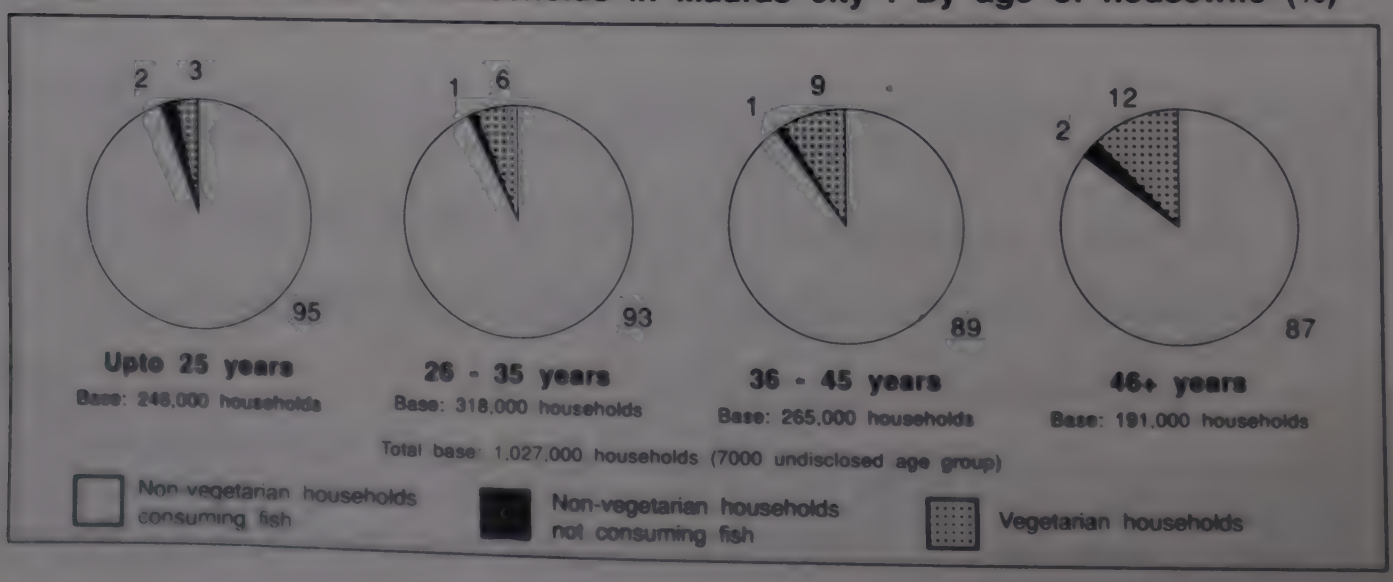


Fig 4. Classification of households in Madras city : By location (%)

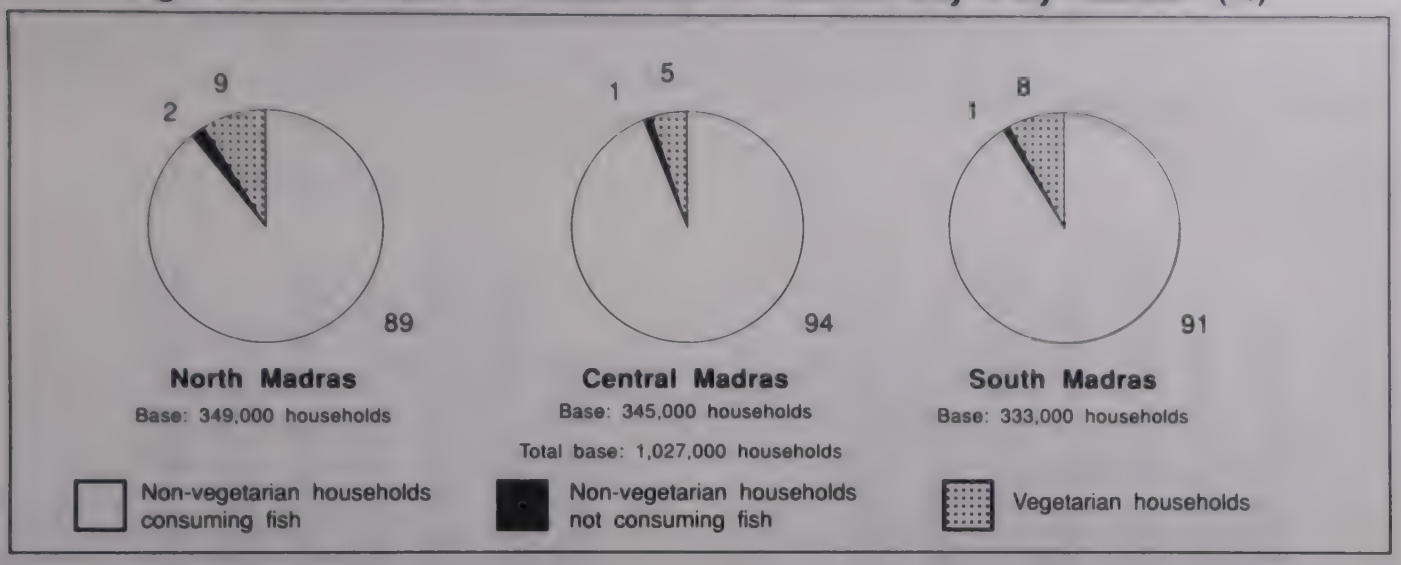
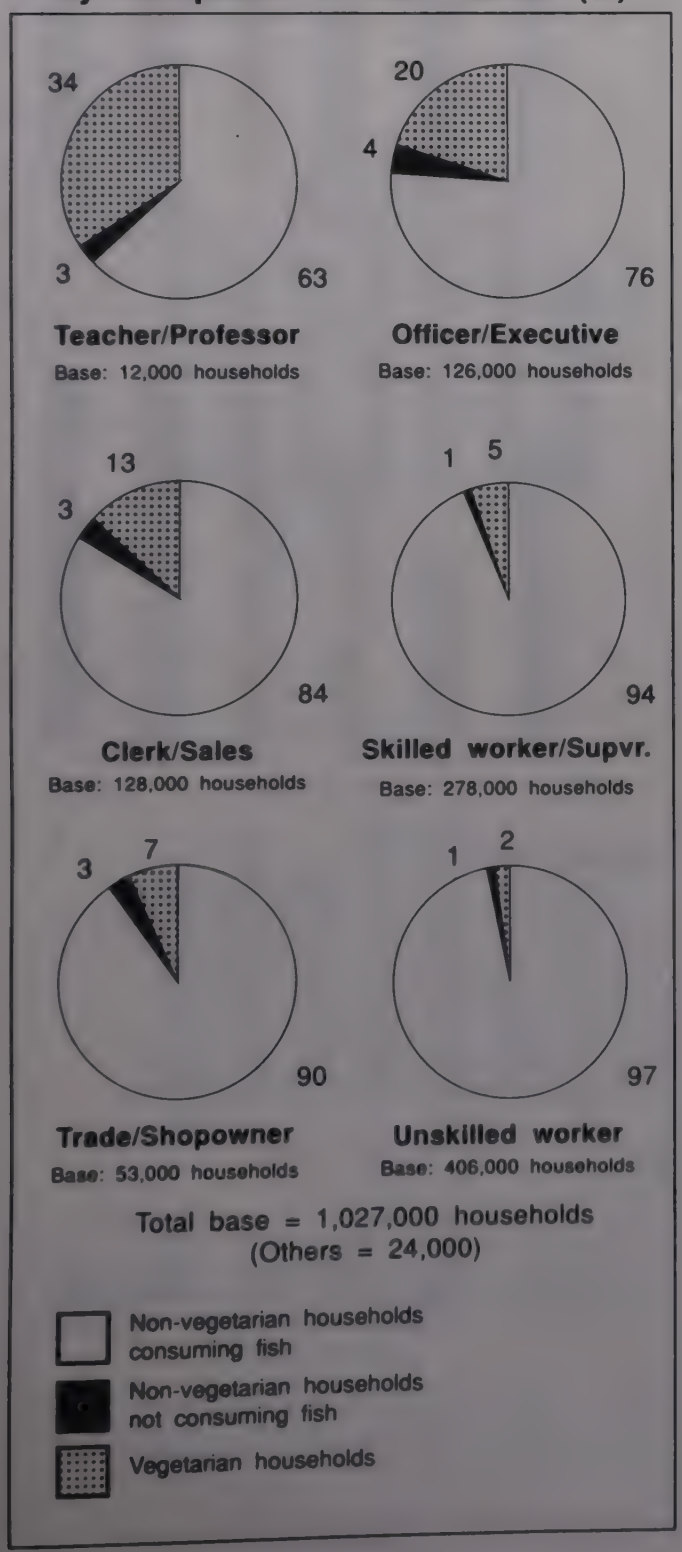


Fig 5. Classification of households in Madras city : By occupation of main earner (%)



1.2 *Incidence of consumption of some high protein items*

All selected housewives were asked whether or not the following items were consumed in their households: Milk, eggs, chicken, mutton, fish and fish products, and other meat.

The incidence of consumption of fish products and eggs is found to be the highest, 91 per cent across all income groups — (see Figure 6 overleaf). The incidence of consumption of fish is much higher in the lowest income group (98 per cent) than in the Rs 4,001+ group (72 per cent). This is not surprising, as the proportion of vegetarians in the upper income group is much higher than in the lower income group. However, in the upper income group, the incidence of consumption of mutton is as high as that of fish/fish products (72 per cent).

The high incidence of consumption of fish products in the lower income group indicates the availability of fish to suit the budget of the consumer. The high incidence of consumption of eggs is only to be expected as it is a "low cost per unit" item that can be easily procured at any time.

While the overall incidence of consumption of milk is only 76 per cent, its consumption is almost universal in households with incomes over Rs 2,000. But it is only 50 per cent in

households with an income below Rs 500. This is again not surprising, as regular consumption of milk would mean incurring a certain fixed expense every month. It would, therefore, seem more economical for this class to buy small units of milk/tea from the nearest teashop as and when the need is felt (see Figures 6 and 7).

Fig 6. Incidence of consumption of some high protein food products : By income (%)

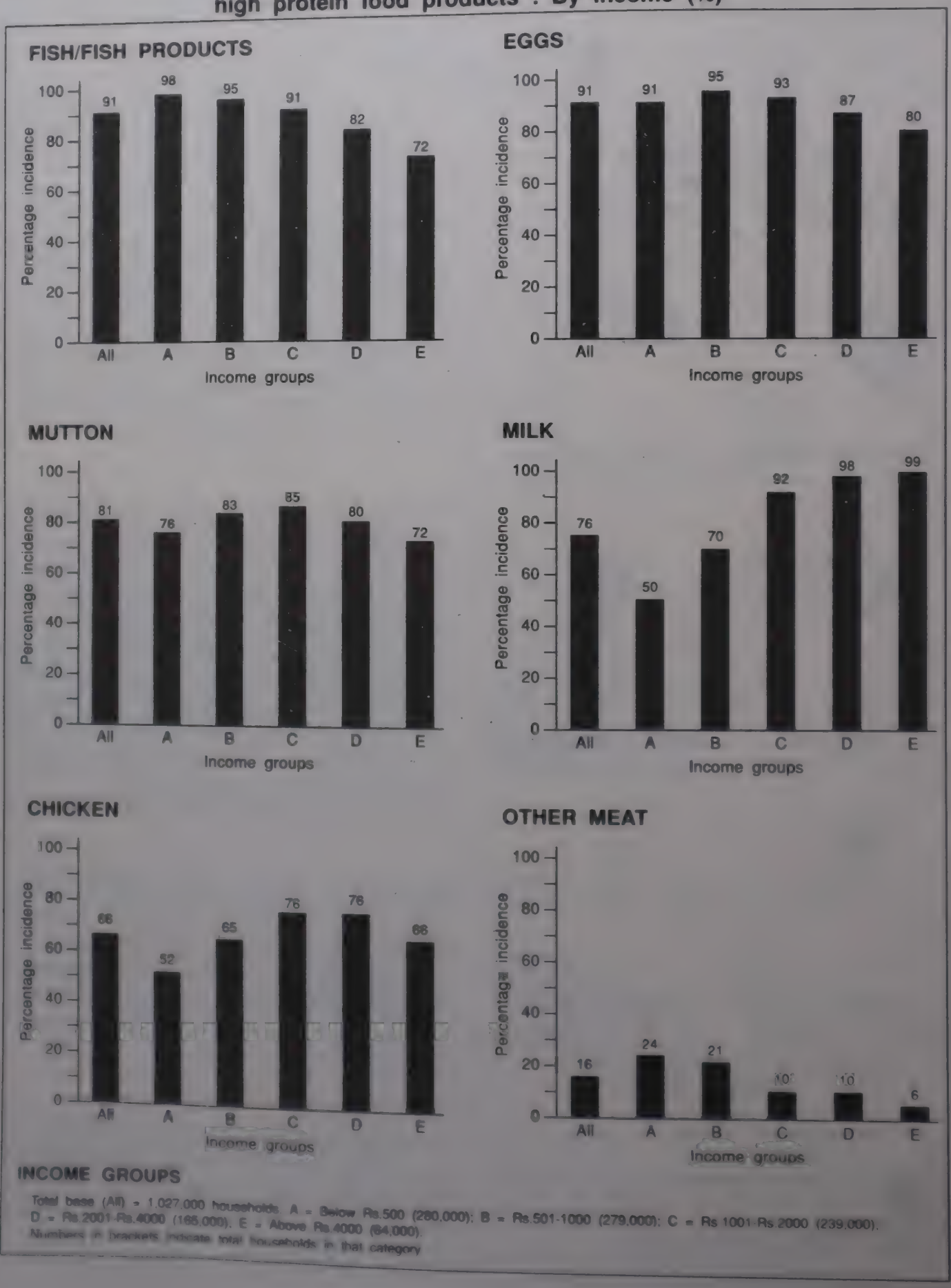
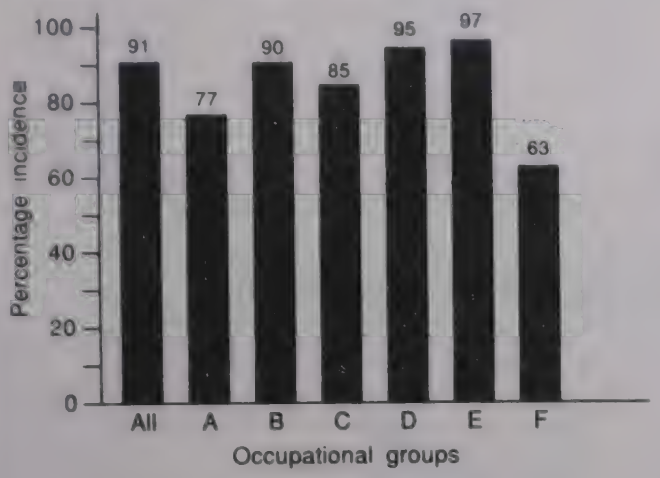
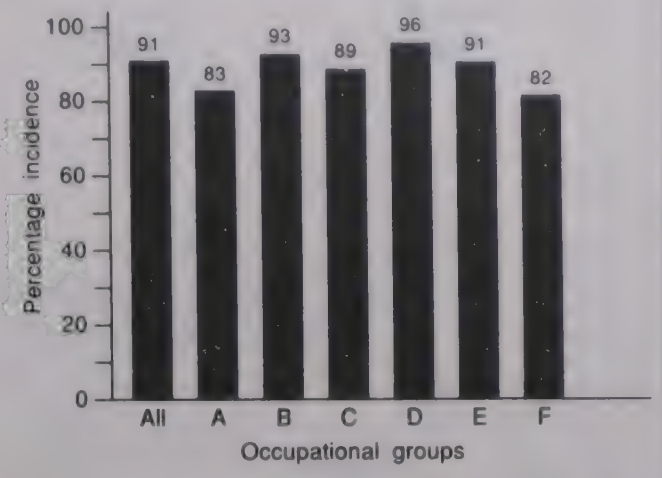


Fig 7. Incidence of consumption of some high protein food products : By main earner's occupation (%)

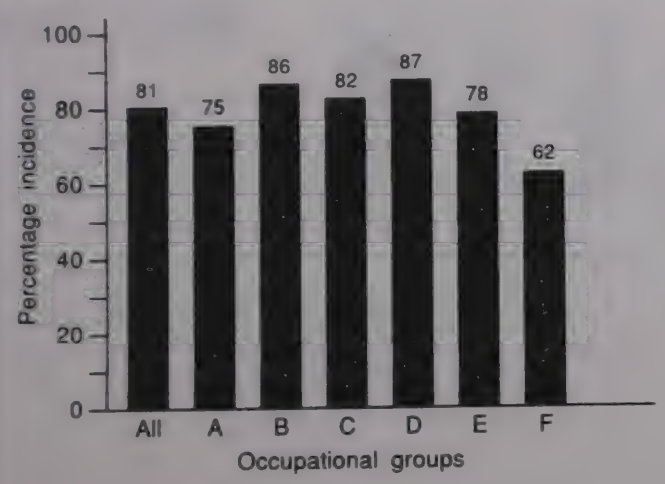
FISH/FISH PRODUCTS



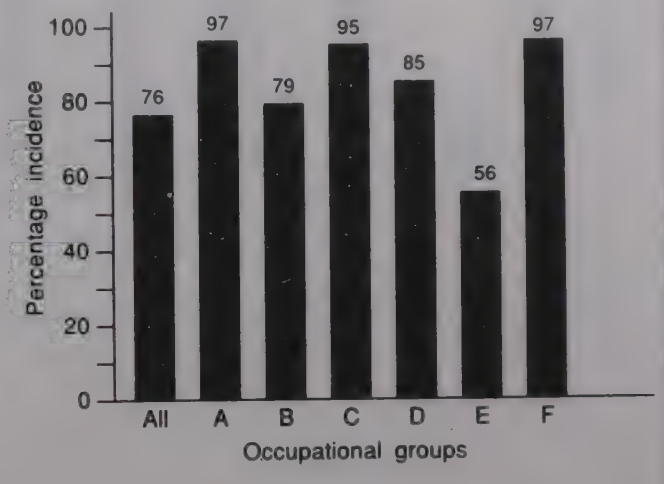
EGGS



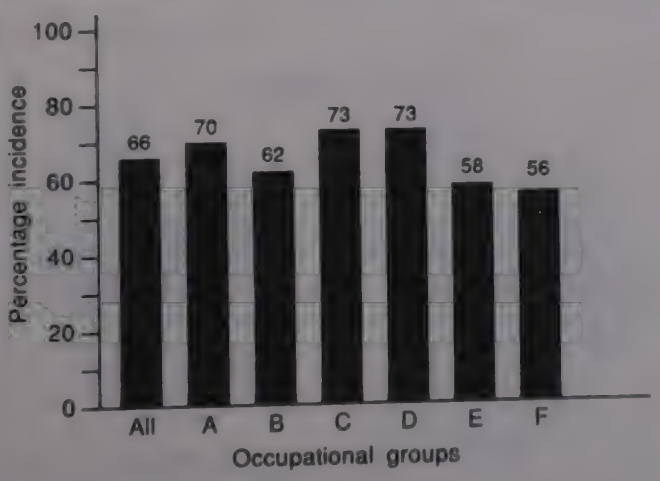
MUTTON



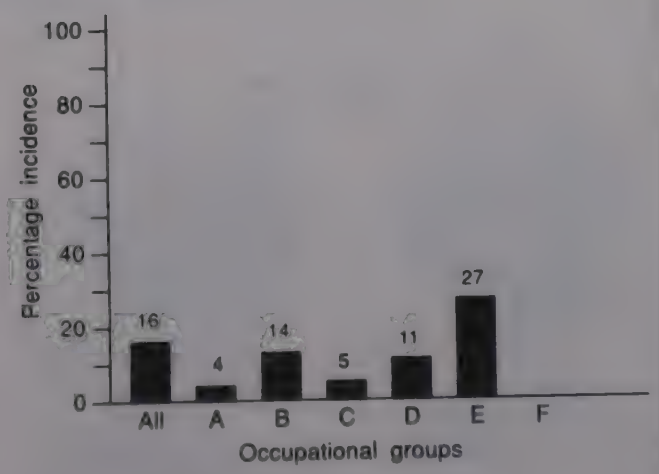
MILK



CHICKEN



OTHER MEAT



OCCUPATIONAL GROUPS

Total base (All) = 1,027,000 households. A = Officer/Executive (126,000); B = Trade/Shopowner (53,000); C = Clerk (128,000); D = Skilled worker (278,000); E = Unskilled worker (406,000); F = Teacher/Professor (12,000); G = Others (24,000). Numbers in brackets indicate total households in that category.

1.3 *Profile of the sample and fish consuming households*

Figures 8 to 13 provide a profile of the sample as well as of those households among them that consume fish. Over half the housewives were below 35, had some schooling and were not working. Most of the main earners had some education and were workers, skilled or unskilled. Over three-quarters of those interviewed were non-Brahmin households and the average household had more than five members.

Fig 8. Age of the housewife (% in each age group)

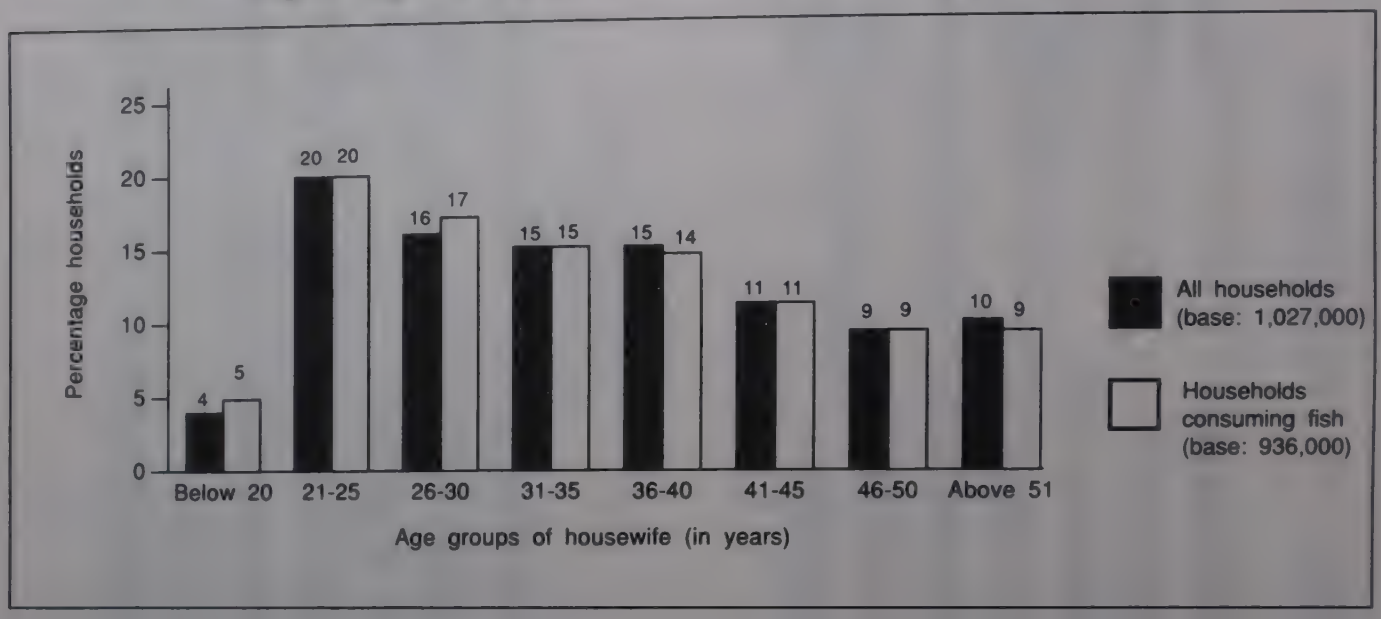


Fig 9. Education of housewife and main earner (%)

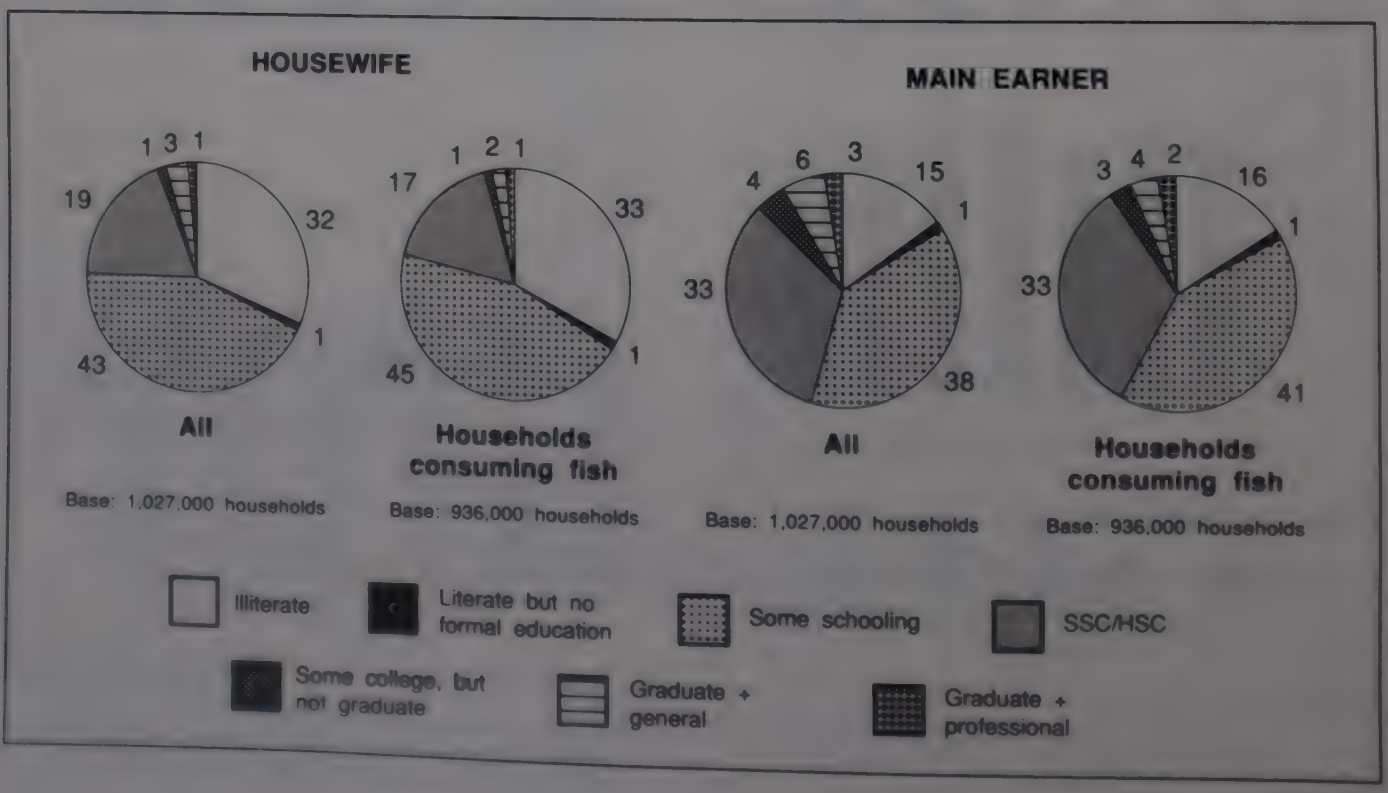


Fig 10. Occupation of main earner (%)

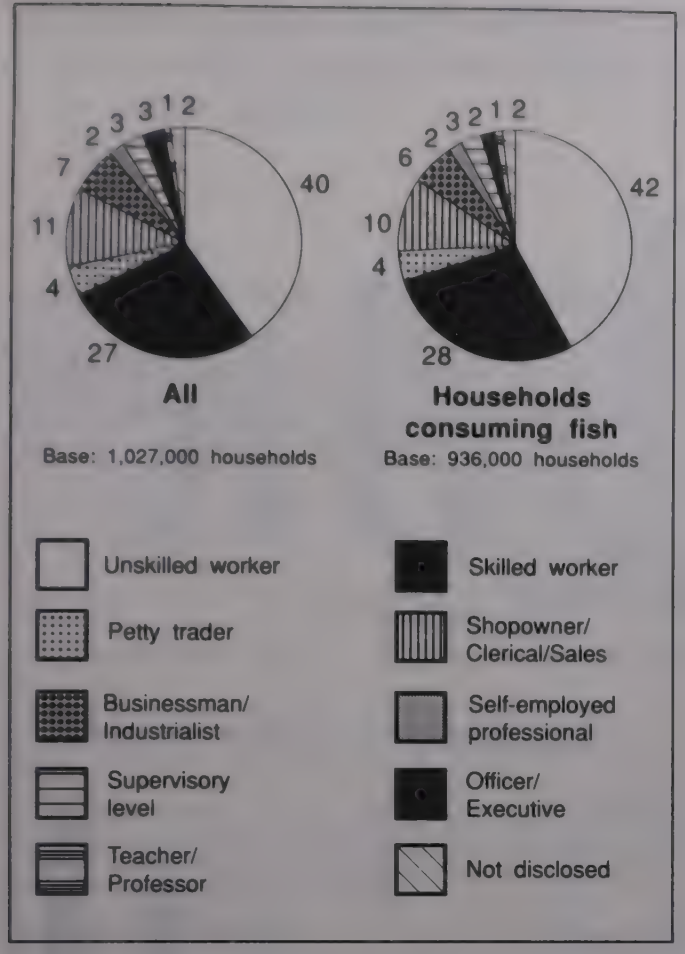


Fig 11. Working status of housewife (%)

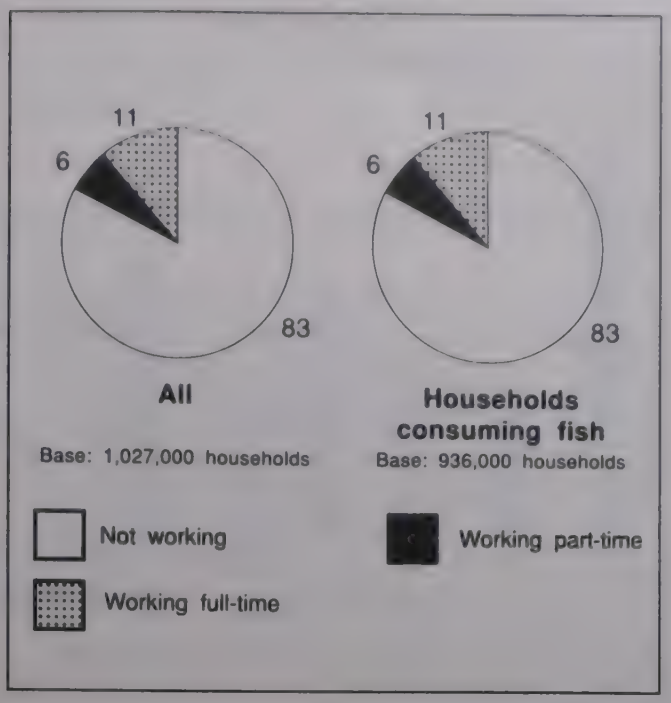


Fig 12. Total family members (%)

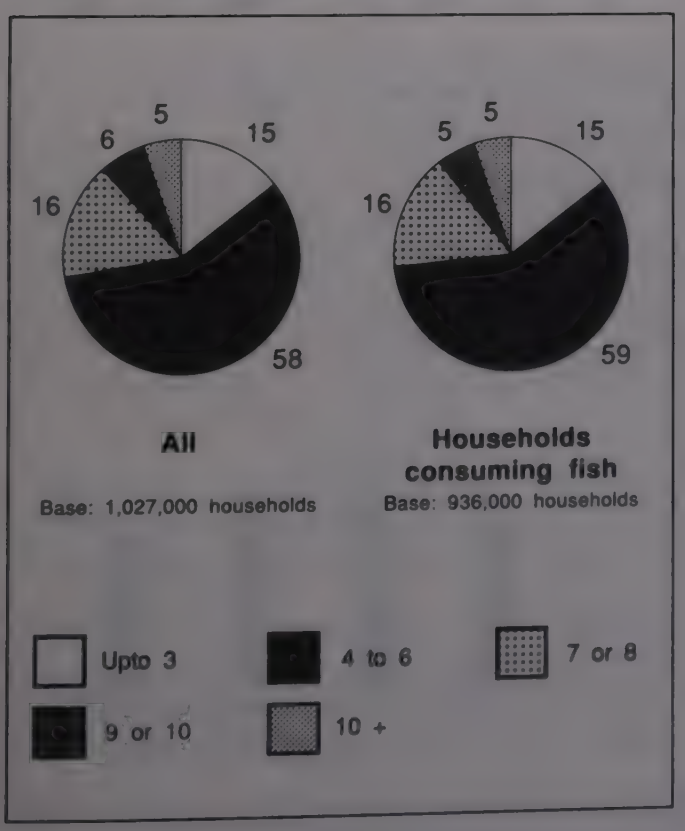
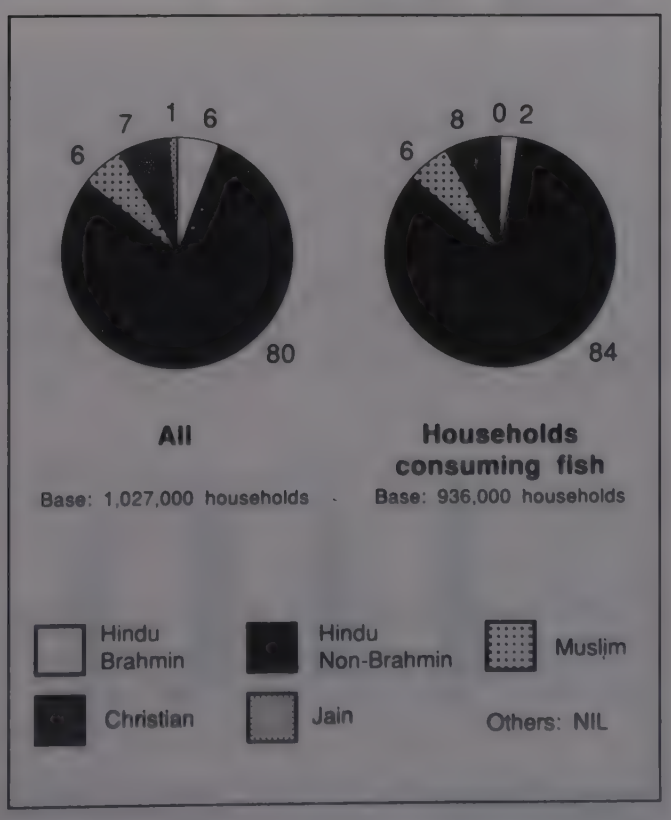


Fig 13. Religion (%)



2. *MONTHLY EXPENDITURE ON FOOD*

Respondents were asked to indicate the total monthly expenditure on food in their households and also to indicate the monthly expenditure on the items of high protein consumed: Milk, eggs, fish products, chicken, mutton and other meats.

2.1 *Average monthly expenditure on all food*

The average monthly expenditure on all food varies from Rs 380 in the lowest income group (below Rs 500) to a little over Rs 2,000 in the over Rs 4,000 group. What is pertinent to note in this is the fact that households with incomes upto 2,000 Rs/month spend over three-fourths of their income on food items. This proportion comes down with increasing household income, but even in the topmost income group food items still account for at least 40 per cent of the expenditure (see Figures 14 and 15).

Fig 14. Monthly expenditure on food: By income and location

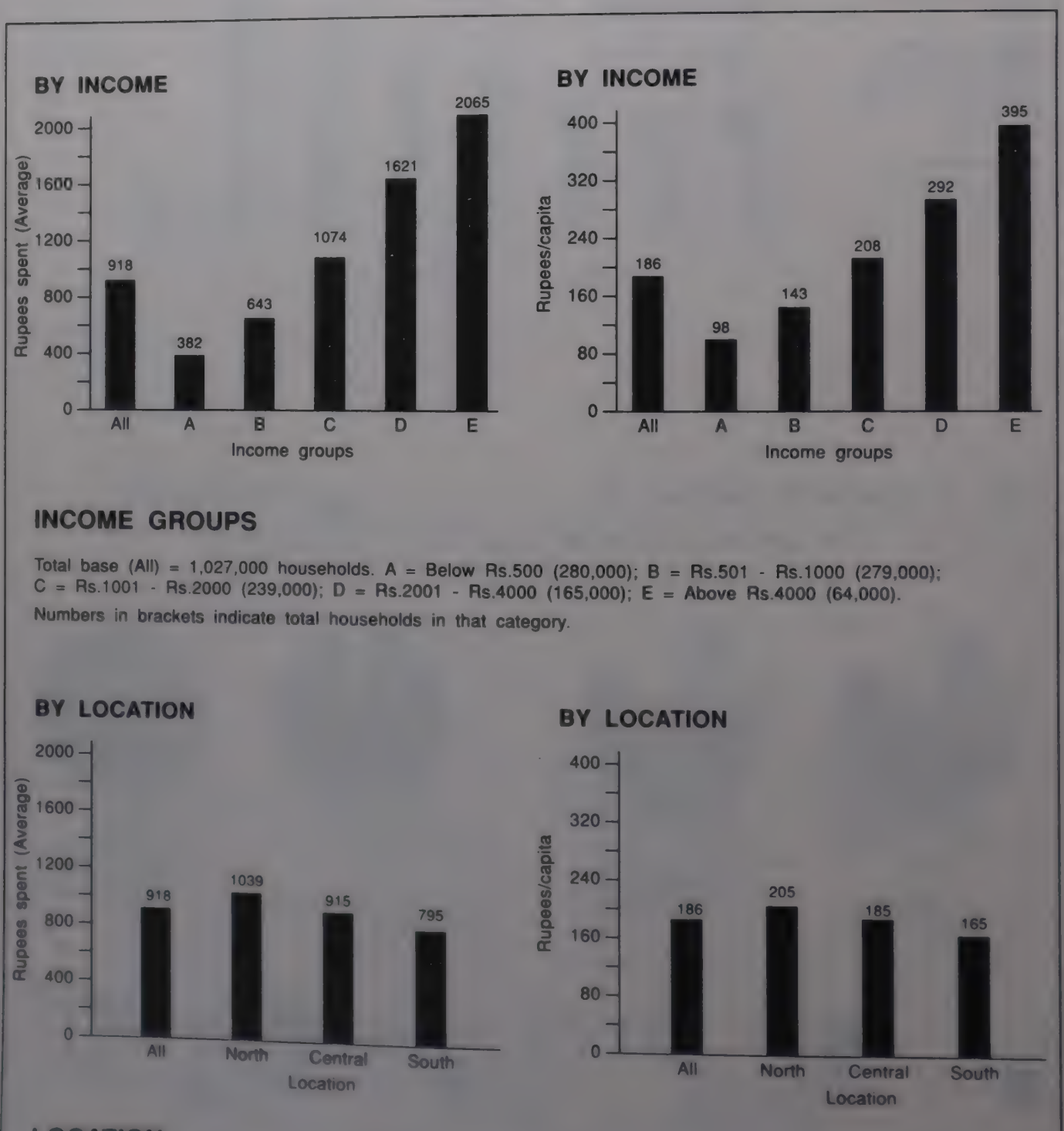
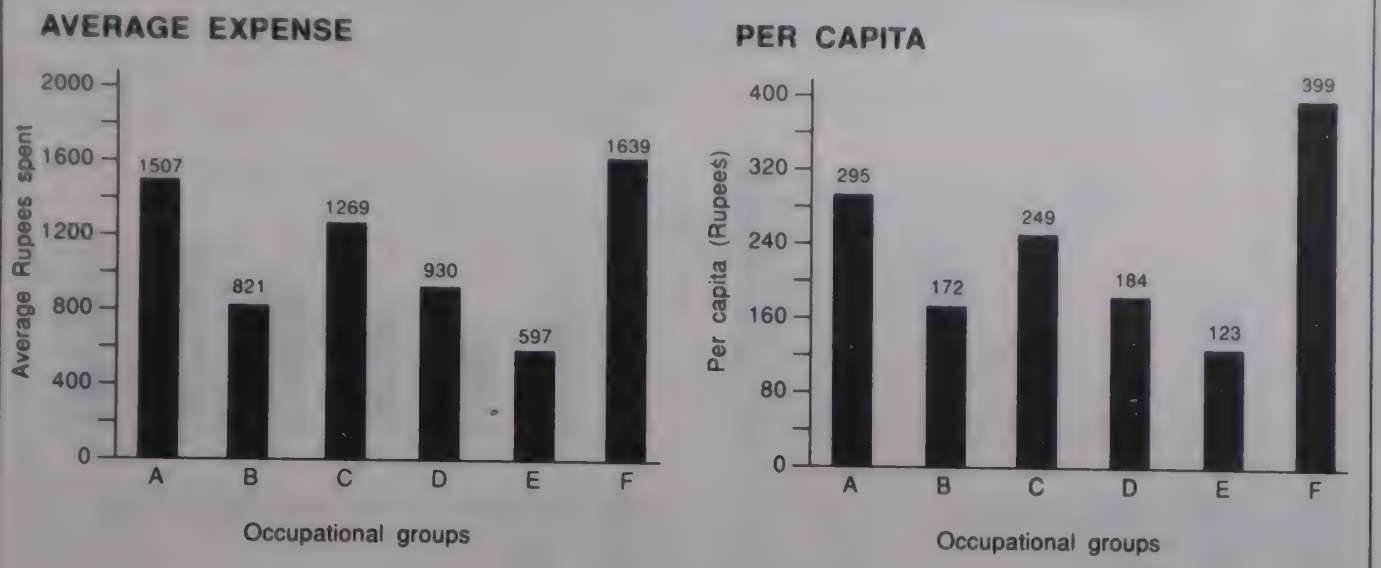


Fig 15. Monthly expenditure on food: By occupation of main earner



OCCUPATIONAL GROUPS

Total base (All) = 1,027,000 households. A = Officer/Executive (126,000); B = Trader/Shopowner (53,000); C = Clerk/Sales/Supervisor (128,000); D = Skilled worker (278,000); E = Unskilled worker (406,000); F = Teacher/Professor (12,000).

(Others = 24,000)

Numbers in brackets indicate total households in that category.

2.2 *Average monthly expenditure on, and consumption of, **fish and fish products.***

The monthly expenditure on fish is Rs 75 across all consuming households and the average monthly consumption is about 3.5 kg of all fish/fish products.

The amount spent on fish varies by income from Rs 43 in the below Rs 500 income groups to Rs 144 in the households with an income over Rs 4000. However, the average amount consumed varies between about 3-5 kg across all income groups (see Figure 16). In the two lowest income groups, 56 per cent and 52 per cent respectively consume less than 2 kg/month, whilst in the middle and upper groups this percentage decreases from 33 (Rs 1001-2000) to 17 per cent (Rs 4000+) (see Figure 17). It would appear that the average cost per kg of fish/fish products consumed increases with increasing income. This would confirm the hypothesis that there are very specific varieties of fish preferred by specific groups of people and that the consumption of fish/fish products is probably enhanced by the availability of such a wide variety of products catering to all income groups.

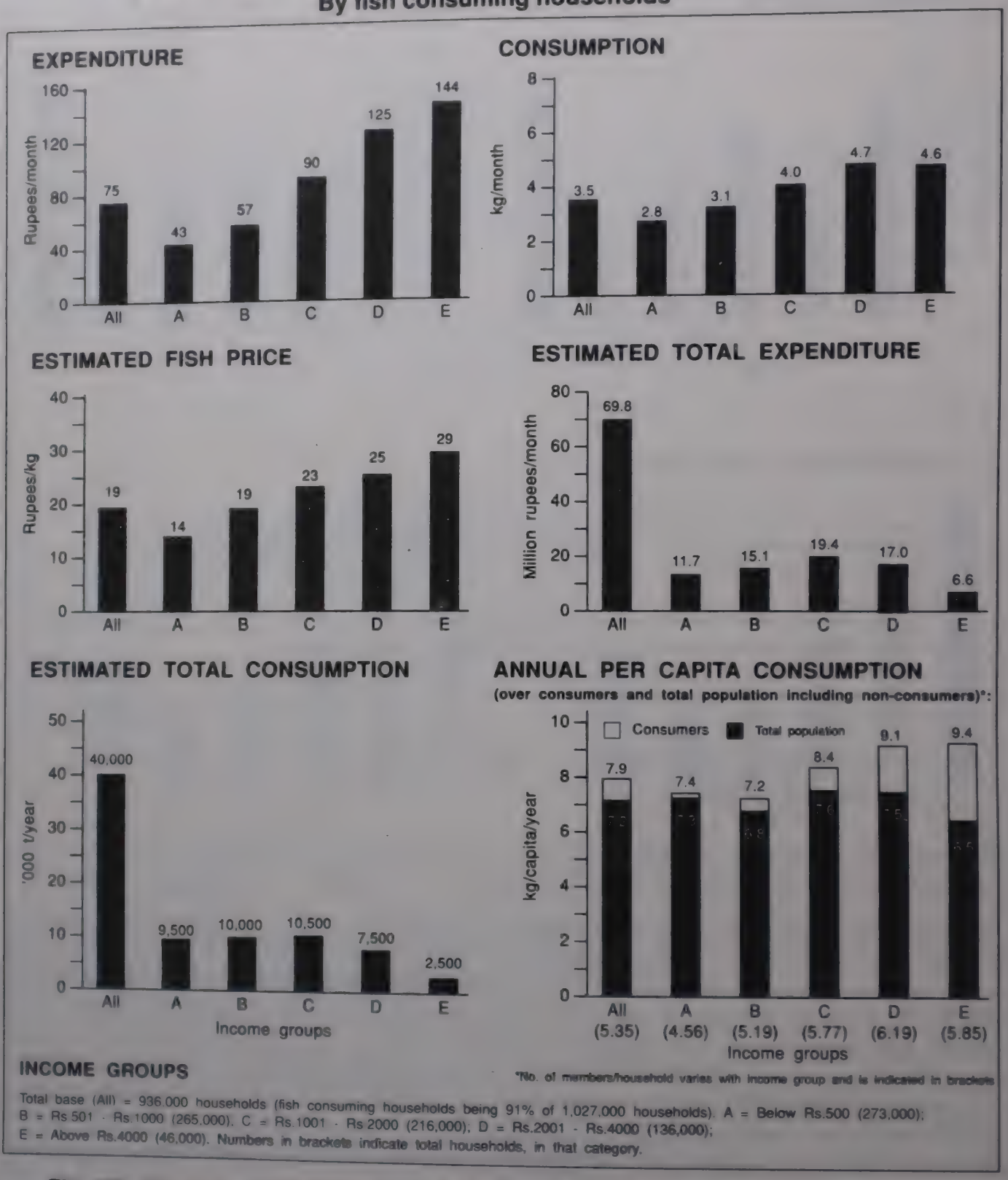
Analysis by location indicates that expenditure on fish is more in North Madras (Rs 86) than in Central (Rs 72) or South (Rs 65). The average quantity consumed is more in North and Central Madras than in South — 4 kg *vs* 3 kg.

At a rough estimate this would mean that about Rs 70 million is spent in Madras city in an average month on household consumption of fish, with 39 per cent of it being spent by those with a monthly household income below Rs 1,000, 13 per cent by those with an income over Rs 4,000 and a little less than half of it by the middle income group.

This would also mean that about 110 t of fish and fish products a day, or about 40,000 t/year, are consumed in and around Madras city. Of this, a little less than half (49 per cent) would be bought by those with an income less than Rs 1,000, about 7 per cent by those with an income

over Rs 4,000 and the rest (44 per cent) by those in the middle income groups. **NB:** Quantities consumed are estimates, as much fish is normally sold in heaps and not by weight in Madras (see Figures 16 and 17).

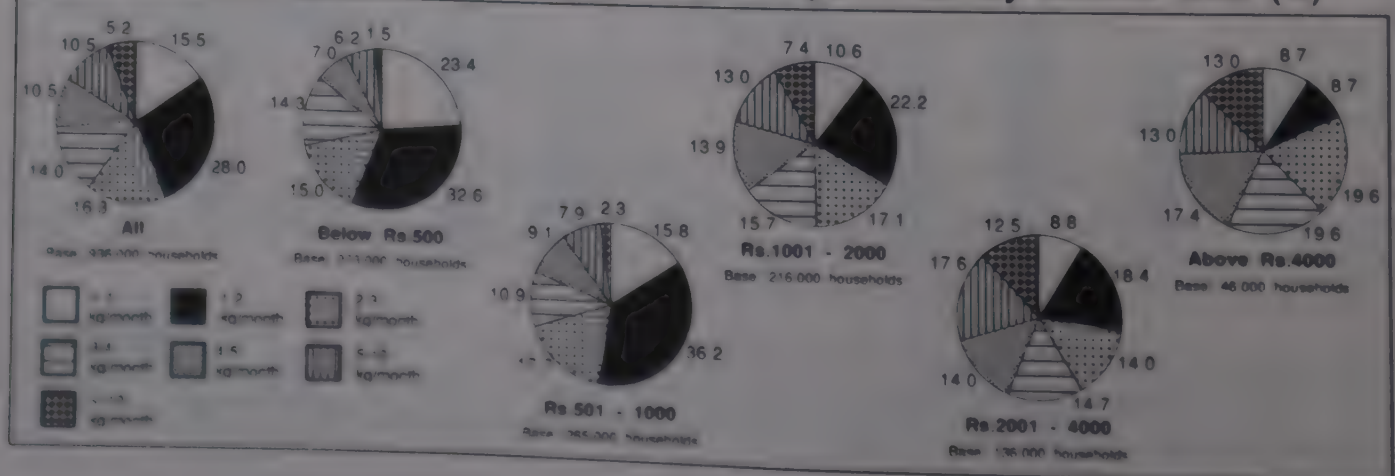
Fig 16. Monthly expenditure and consumption of fish & fish products: By fish consuming households



*No. of members/household varies with income group and is indicated in brackets

Total base (All) = 936,000 households (fish consuming households being 91% of 1,027,000 households). A = Below Rs.500 (273,000); B = Rs.501 - Rs.1000 (265,000). C = Rs.1001 - Rs.2000 (216,000); D = Rs.2001 - Rs.4000 (136,000); E = Above Rs.4000 (46,000). Numbers in brackets indicate total households, in that category.

Fig 17. Monthly consumption of fish & fish products: By income level (%)



2.3 *Average monthly expenditure on, and consumption of,* ***eggs***

The average monthly expenditure on eggs varies from Rs 15 in the lower income groups (below Rs 500) to Rs 59 in the above Rs 4,000 group. Accordingly, the average number of eggs consumed also varies from about two dozens to about ten dozens. Interestingly, the vegetarian households consume on an average seven dozen eggs a month as against four dozen eggs consumed in the non-vegetarian, fish consuming households, and five dozen in the non-vegetarian, non-fish consuming households (see Figures 18 and 19).

Fig 18. Monthly expenditure and consumption of eggs: By egg consuming households

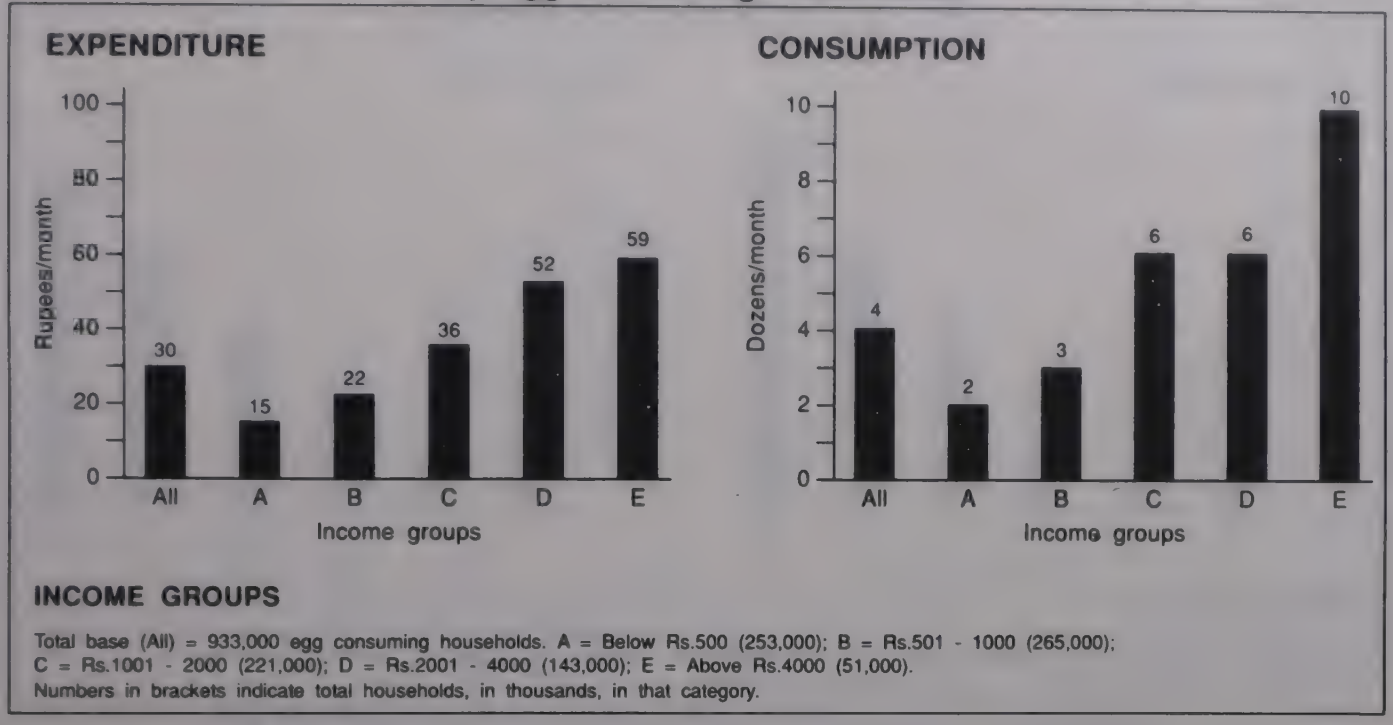
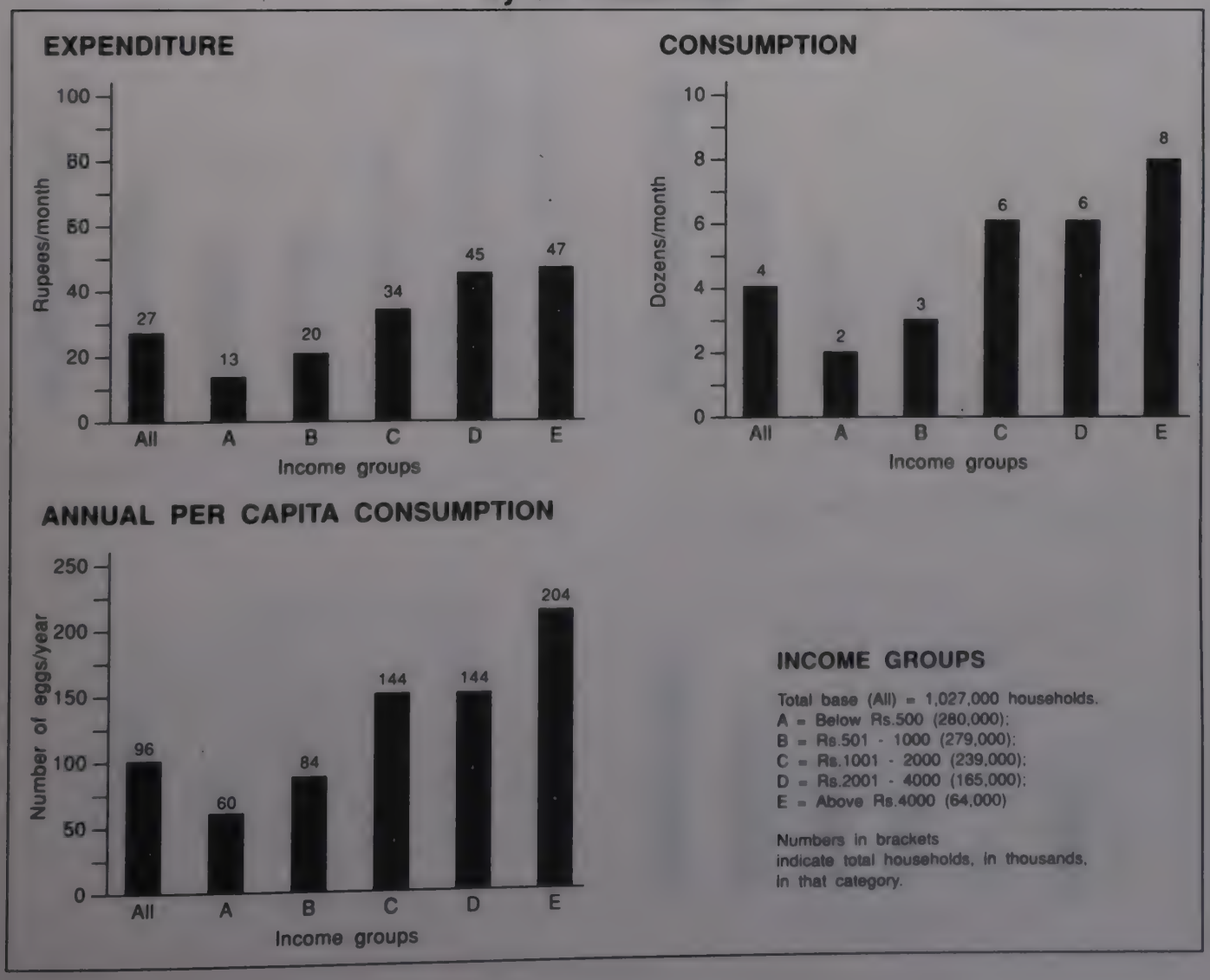


Fig 19. Monthly expenditure and consumption of eggs: By all households



2.4 *Average monthly expenditure on, and consumption of,* ***milk***

Average monthly expenditure on milk is higher than all other items across all households. However, expenditure on the item increases with income (Rs 43 in the below Rs 500 to Rs 250 in the above Rs 4,000 income group). The vegetarians' expenditure on milk is almost double that of the non-vegetarians. The quantity consumed by an average household also varies from 9 litres in the below Rs 500 income household to 43 litres in a household with over Rs 4,000 income (see Figures 20 and 21).

Fig 20. Monthly expenditure and consumption of milk: By milk consuming households

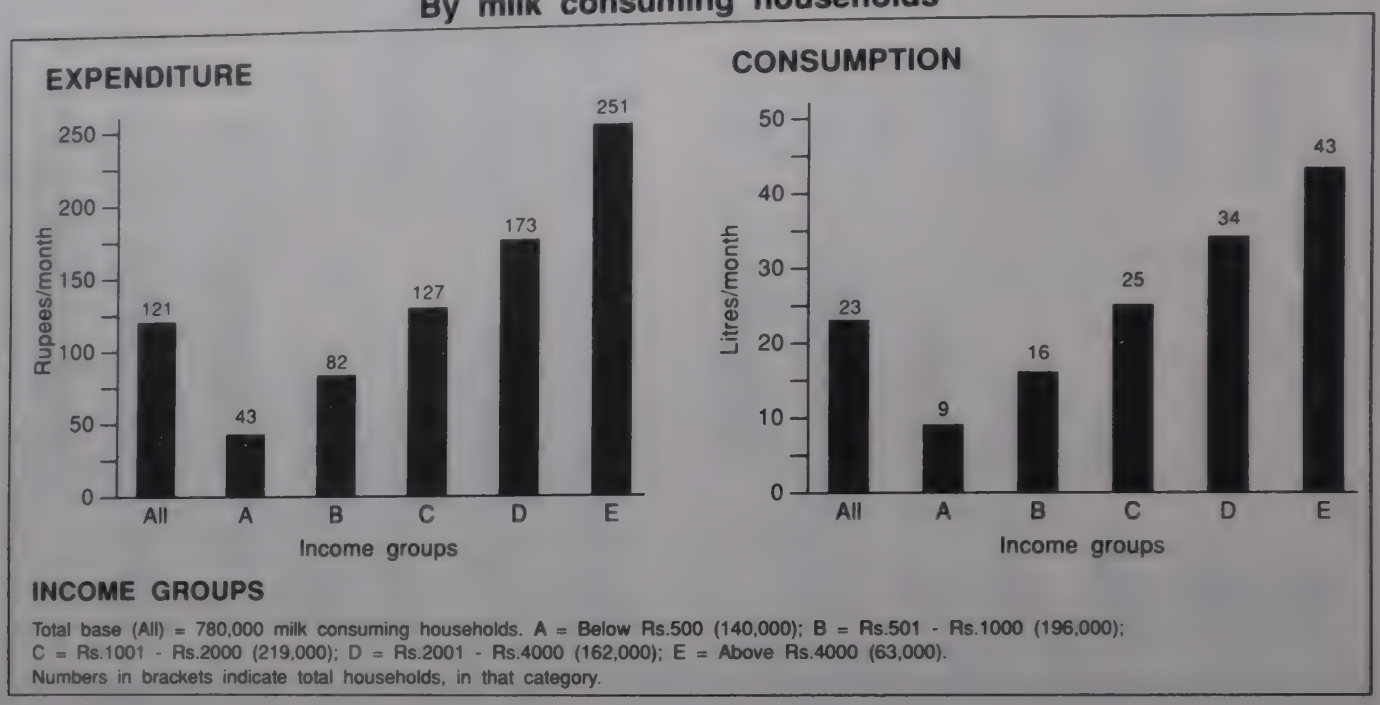
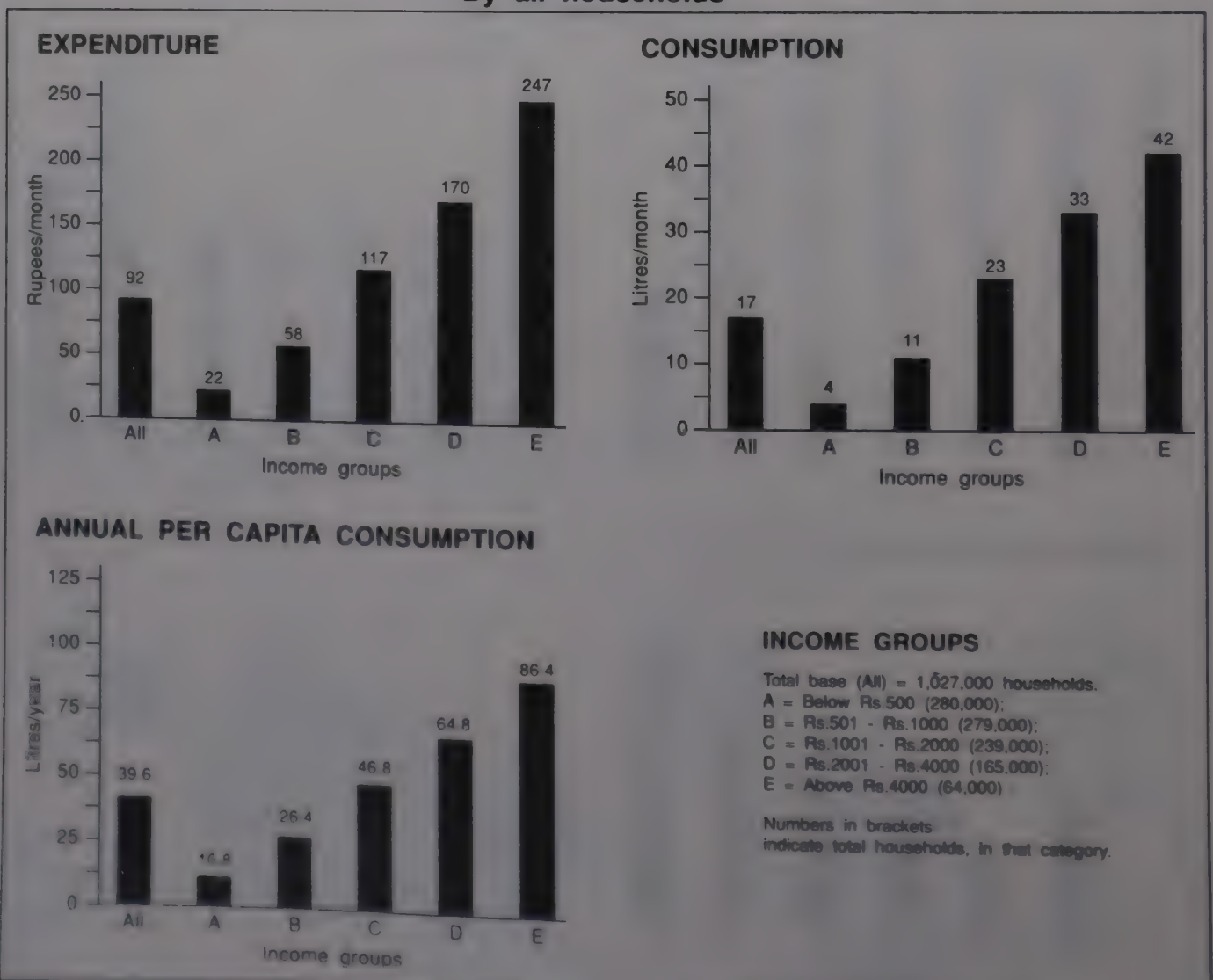


Fig 21. Monthly expenditure and consumption of milk: By all households



2.5 *Average monthly expenditure on, and consumption of,* ***mutton***

The average expenditure per month on mutton is Rs 68 across all consuming households. This varies from Rs 33 in the below Rs 500 income group to Rs 126 in the over Rs 4,000 income group. The increase in expenditure is gradual with increasing income. The average quantity consumed varies from 1 kg in the lower income groups to 2 kg in the middle income groups to 3 kg in the upper income groups (see Figures 22 and 23).

Fig 22. Monthly expenditure and consumption of mutton: By mutton consuming households

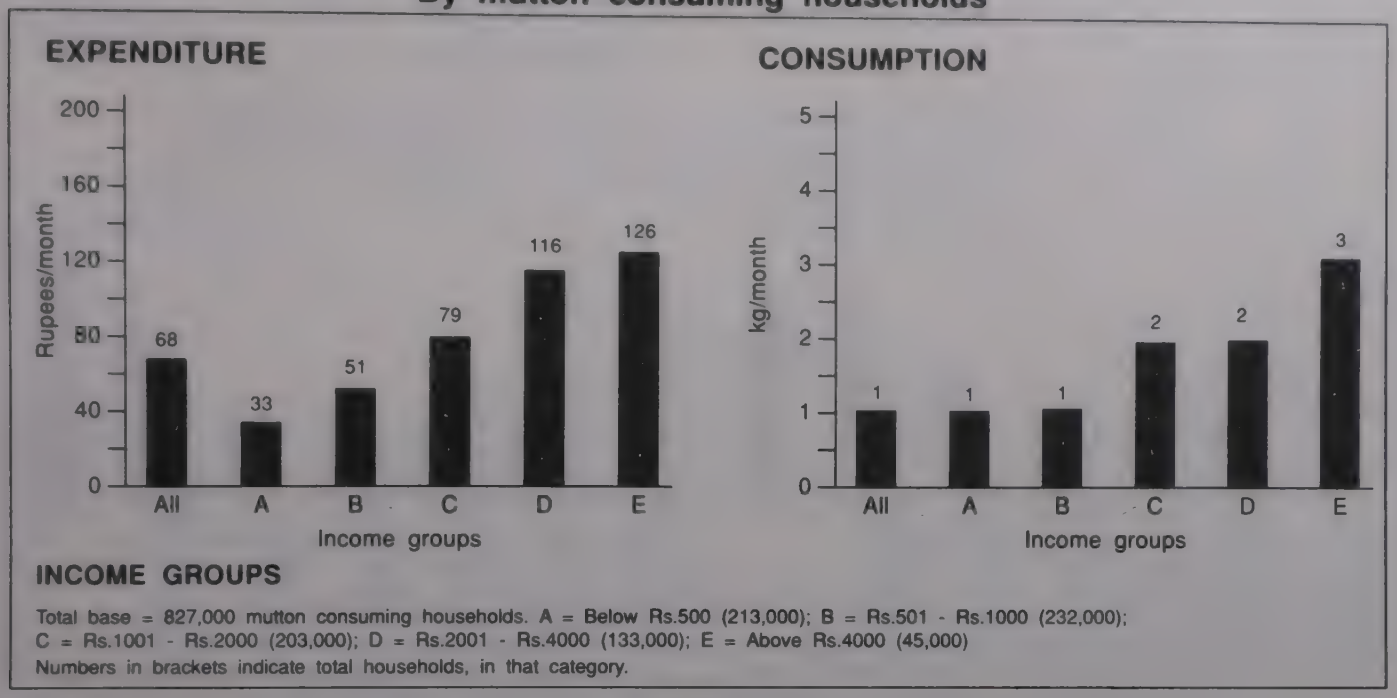
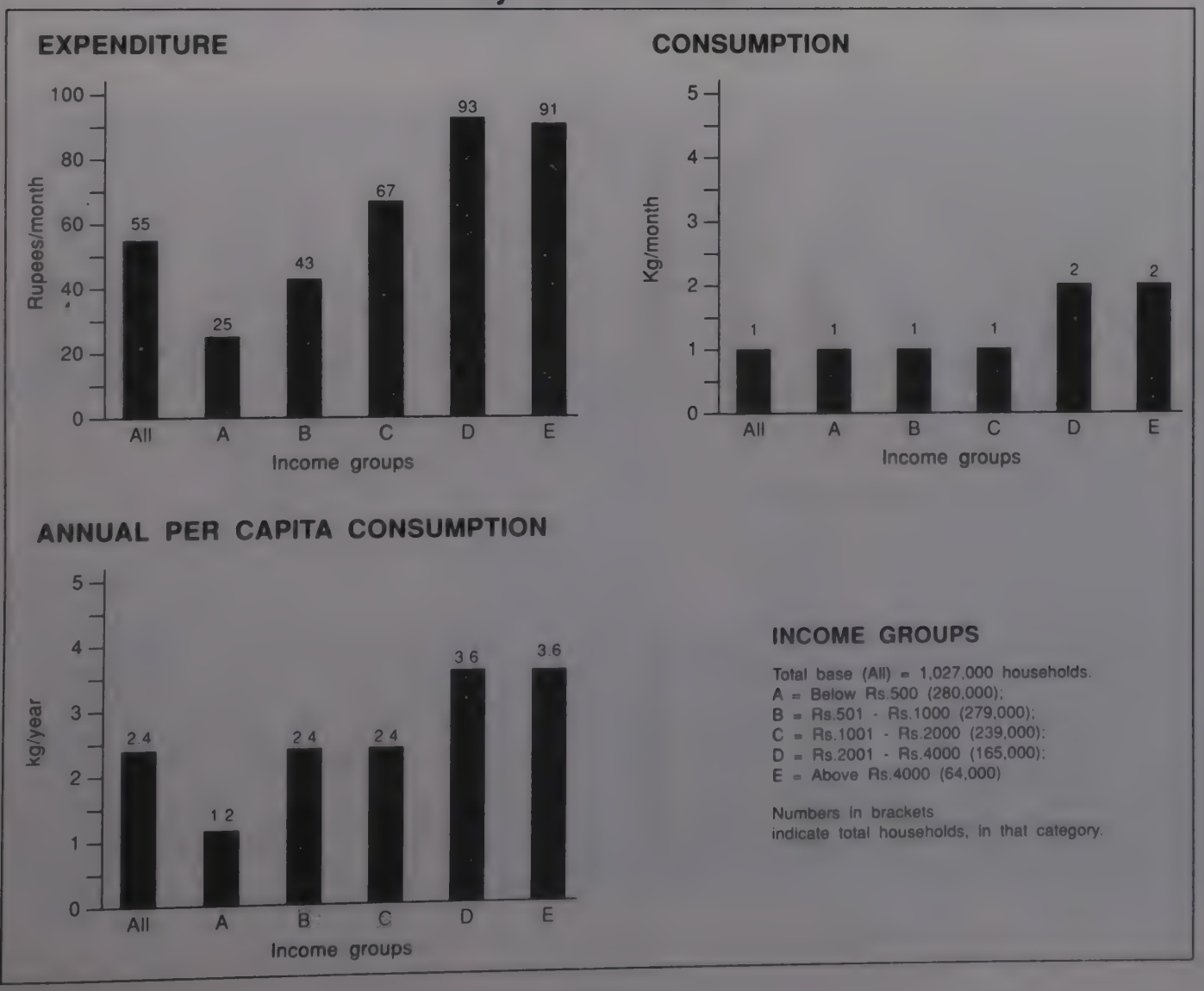


Fig 23. Monthly expenditure and consumption of mutton: By all households



2.6 Average monthly expenditure on, and consumption of, ***chicken***

The monthly expenditure on chicken, even among consuming households, is less than that on mutton. Here too, there is an increase in expenditure with increase in income (Rs 24 in the Rs 500 and below income group to Rs 110 in the over Rs 4,000 income group). The average quantities consumed vary from 1 to 3 kg (see Figures 24 and 25).

Fig 24. Monthly expenditure and consumption of chicken: By chicken consuming households

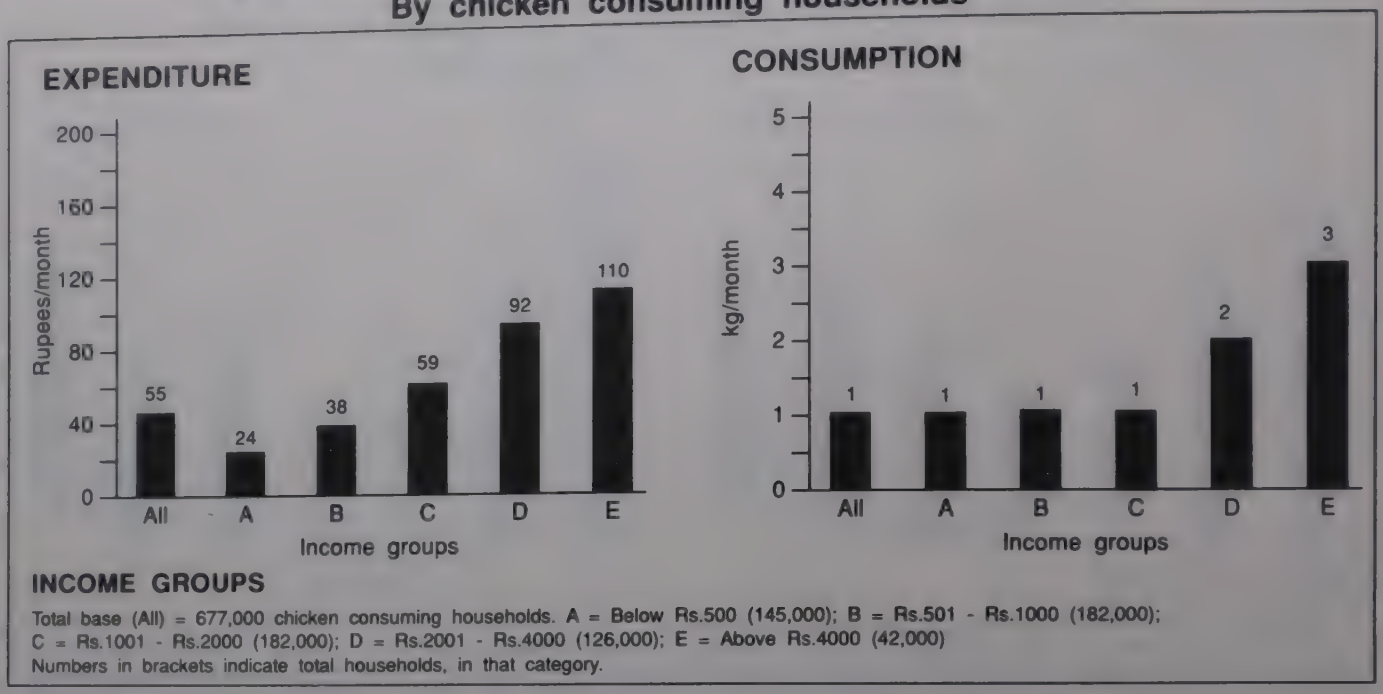
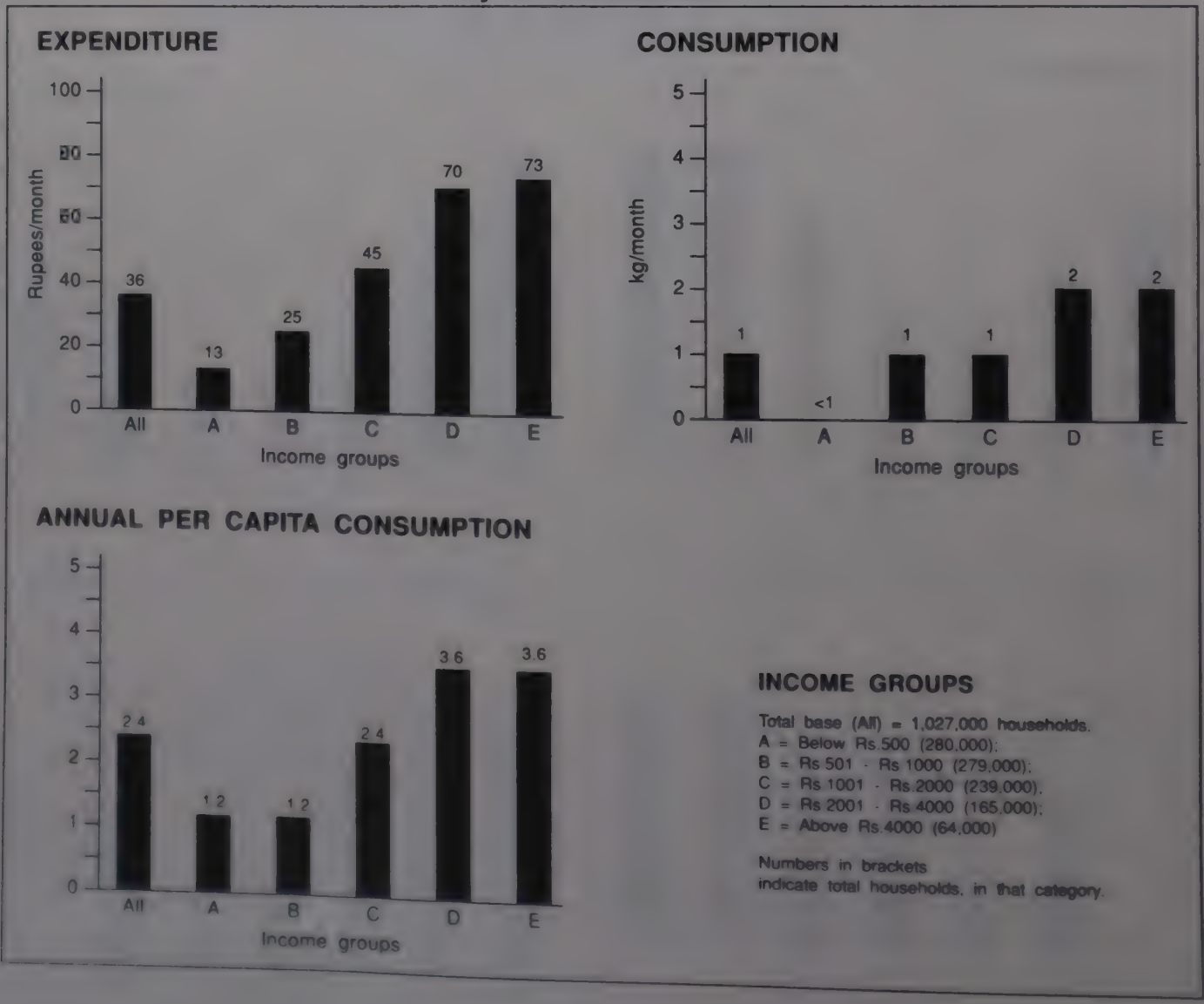


Fig 25. Monthly expenditure and consumption of chicken: By all households

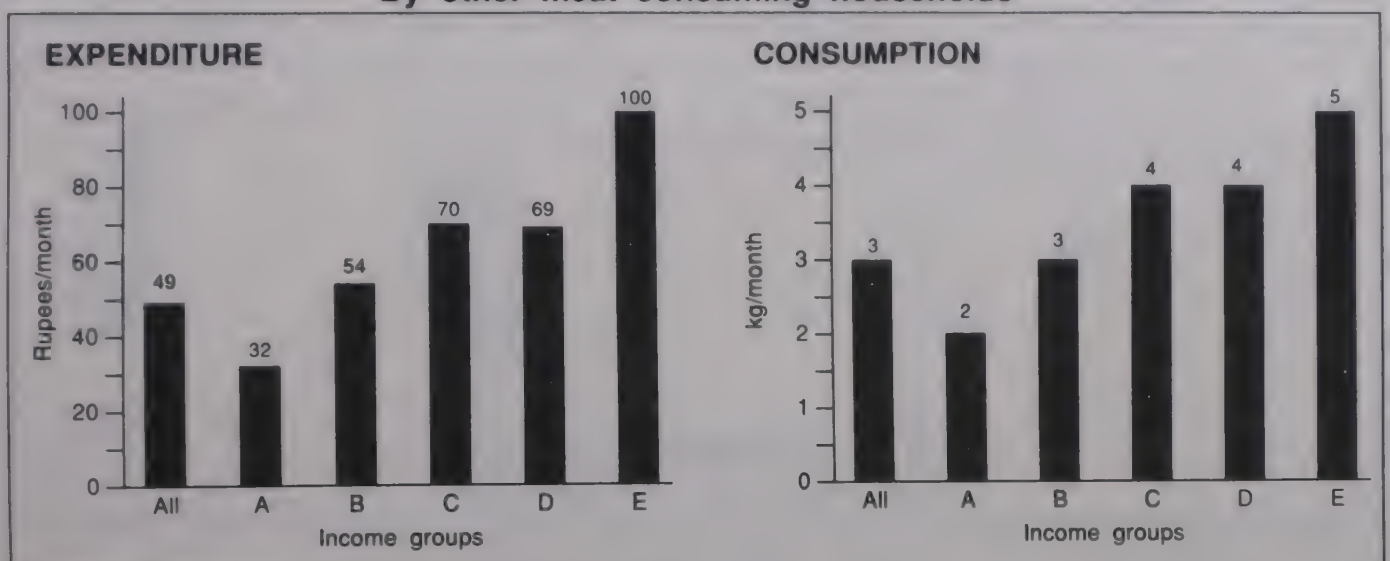


2.7 *Average monthly expenditure on, and consumption of, other meat*

The incidence of consumption of other meat, as seen in Sec. 1.2, is very low. However, amongst consuming households, the average monthly expenditure is almost as much as that of other items discussed earlier and range from Rs 32 in the lower income group to Rs 100 in the highest income group. The average quantities consumed vary from 2 to 5 kg. The consumption of other meat is more pronounced amongst the Clerical/Sales and Supervisory categories (see Figure 26).

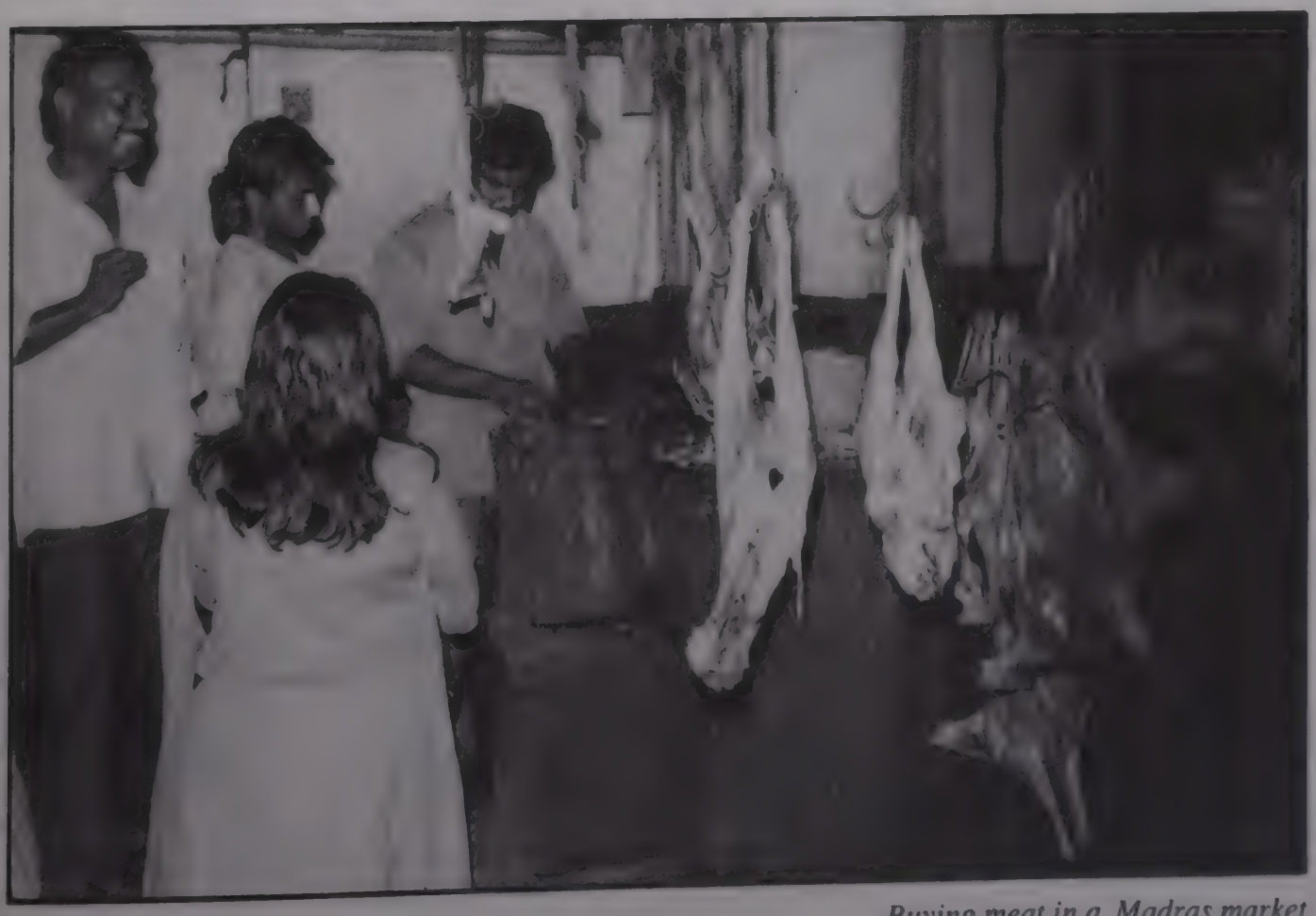
The average consumption of other meat, when looked at from the point of view of **ALL** households, appears negligible, about a tenth of a kilo per person and involving an expenditure of around Rs 8.

Fig 26. Monthly expenditure and consumption of other meat: By other meat consuming households



Total base = 160,000 households consuming other meat. A = Below Rs.500 (66,000); B = Rs.501 - Rs.1000 (58,000); C = Rs.1001 - Rs.2000 (25,000); D = Rs.2001 - Rs.4000 (10,000); E = Above Rs.4000 (1,000)

Numbers in brackets indicate total households, in that category.



Buying meat in a Madras market

3. CONSUMPTION OF FISH/FISH PRODUCTS IN HOUSEHOLDS

3.1 *Perceptions relating to consumption of fish, mutton and chicken*

Statements relating to nutrition/health, value for money, taste, ease of preparation and availability were read out and the respondents asked to indicate to which item (chicken, mutton or fish) the statement was more applicable.

It was noted that across all income groups, a higher proportion perceive fish to be more nutritious, better for health, giving more value for money, more tasty, easier to cook and more easily available than chicken or mutton. The only aspect on which fish scored lower than mutton or chicken was in 'ease of cleaning'. Fish was seen to have better value for money by two-thirds of the respondents and six out of ten felt it was more easily available.

The parameters 'better value for money' and 'ease of availability' were more pronounced in favour of fish in the lower income group. But the 'better value for money' perception could probably be due to no other reason than the fact that fish is more versatile and a wider variety of fish is available at prices suited to people's budgets (see Figures 27 to 34).

Fig 27. Perceptions relating to fish, mutton and chicken (%)

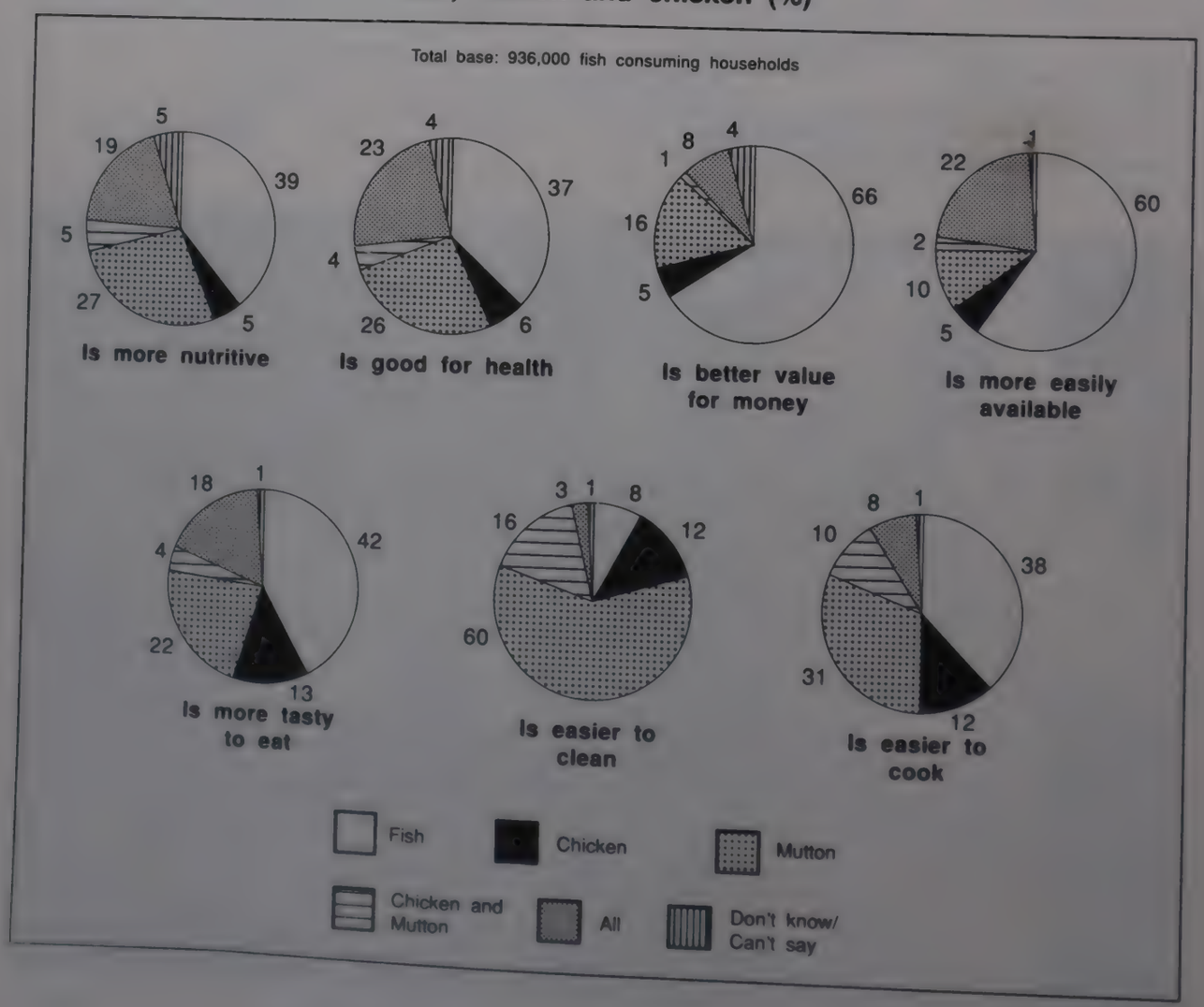


Fig 28. Perceptions relating to fish, mutton and chicken (%) 'IS BETTER VALUE FOR MONEY'

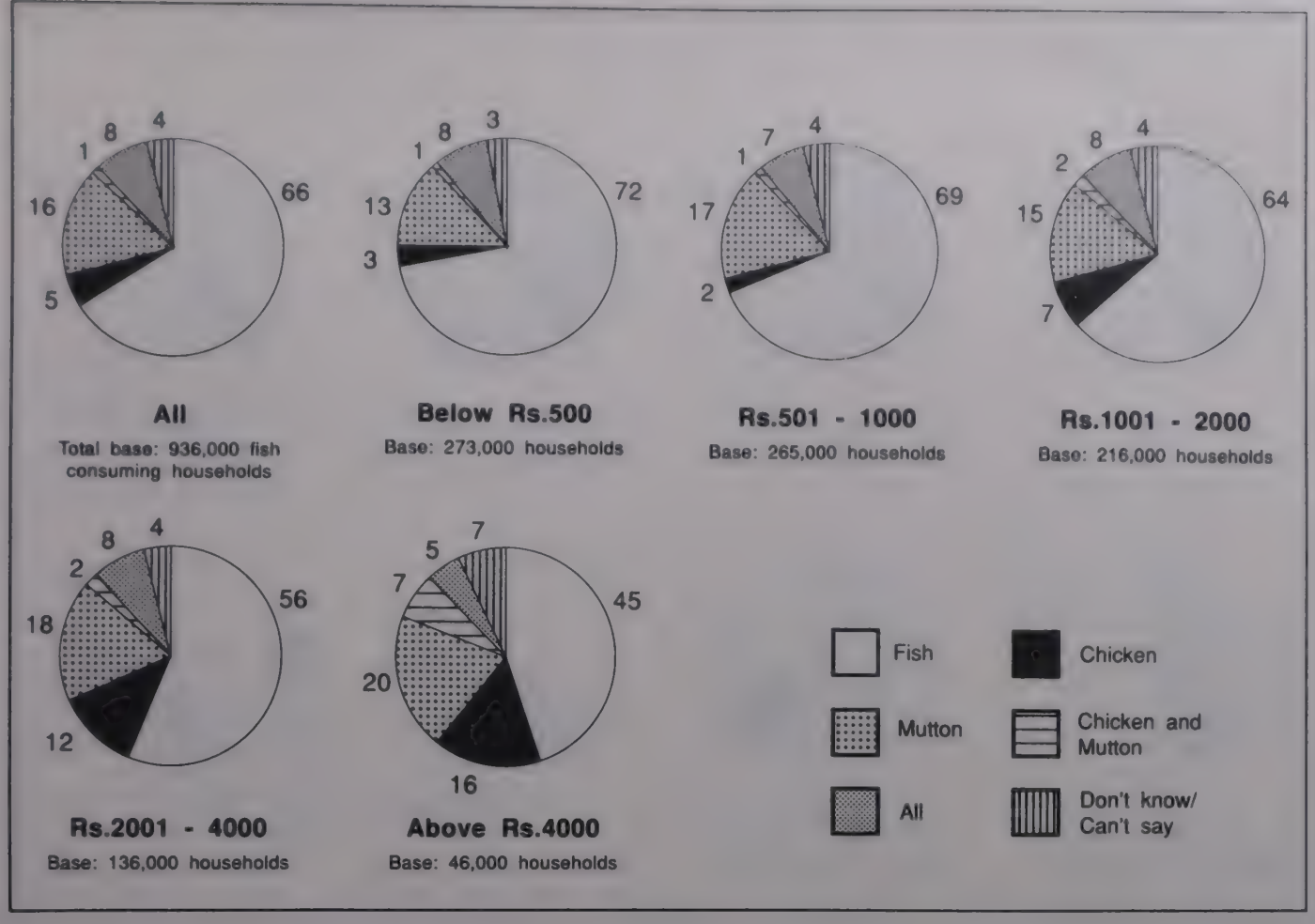


Fig 29. Perceptions relating to fish, mutton and chicken (%) 'IS MORE TASTY TO EAT'

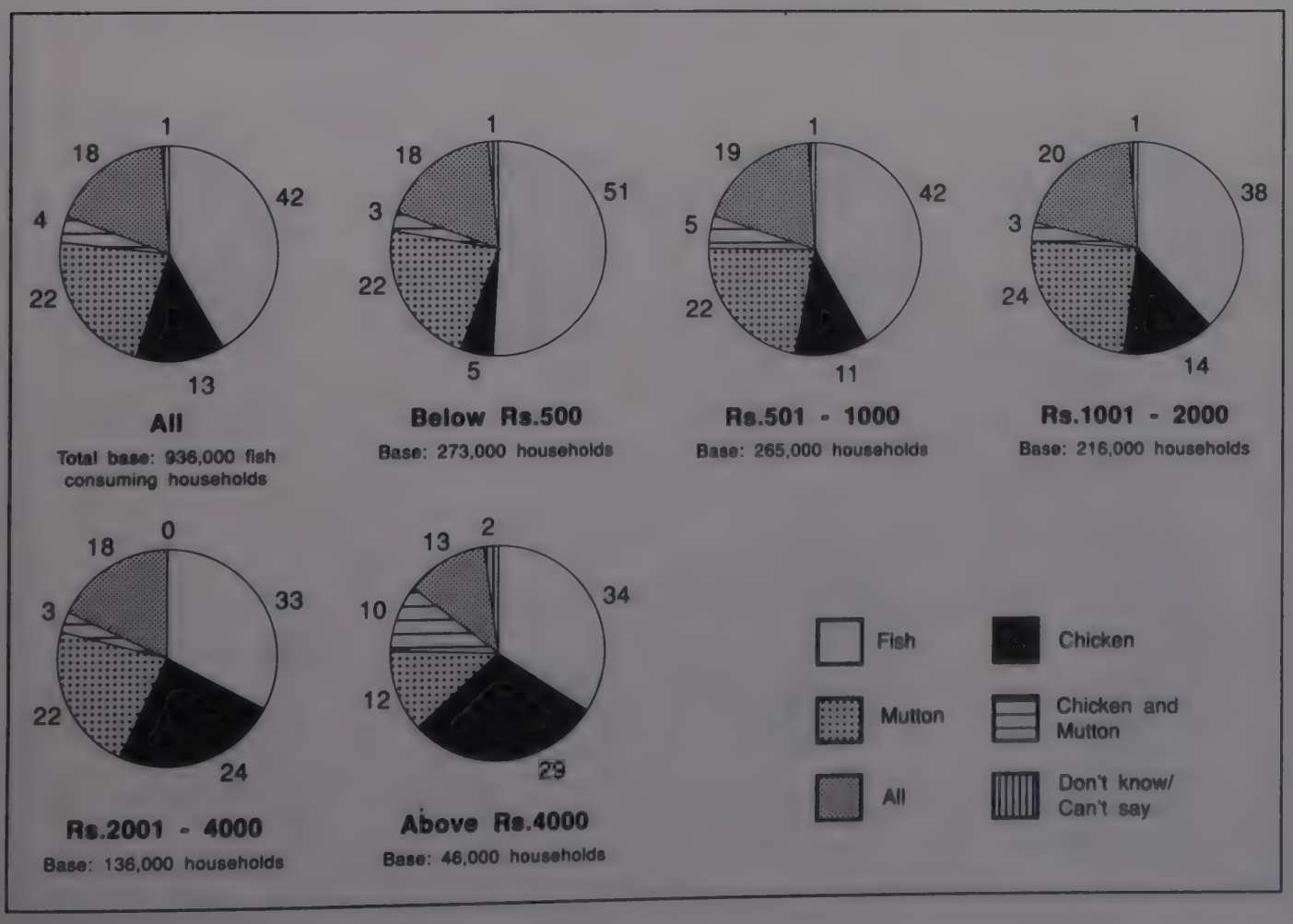


Fig 30. Perceptions relating to fish, mutton and chicken (%) 'IS MORE EASILY AVAILABLE'

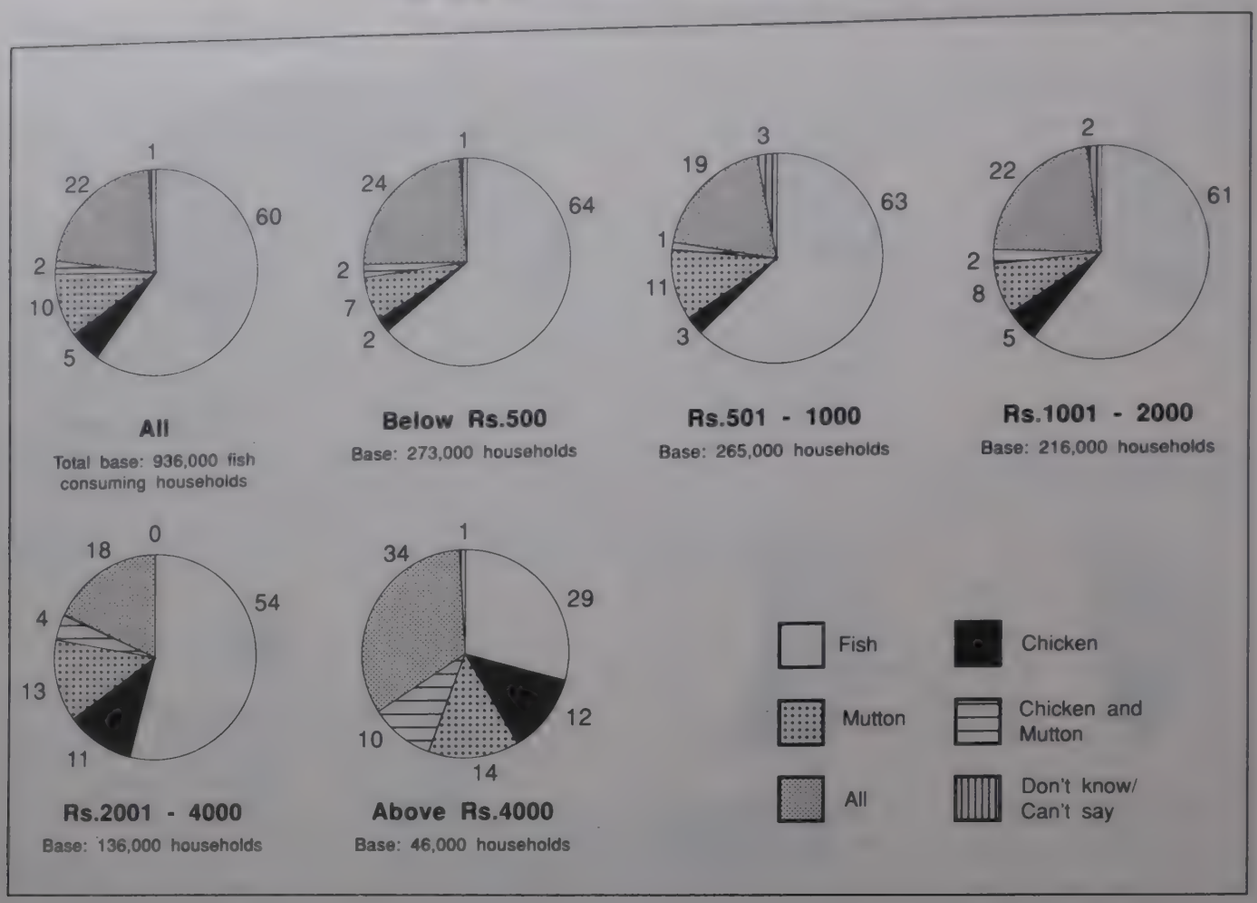


Fig 31. Perceptions relating to fish, mutton and chicken (%) 'HAS MORE NUTRITIVE VALUE'

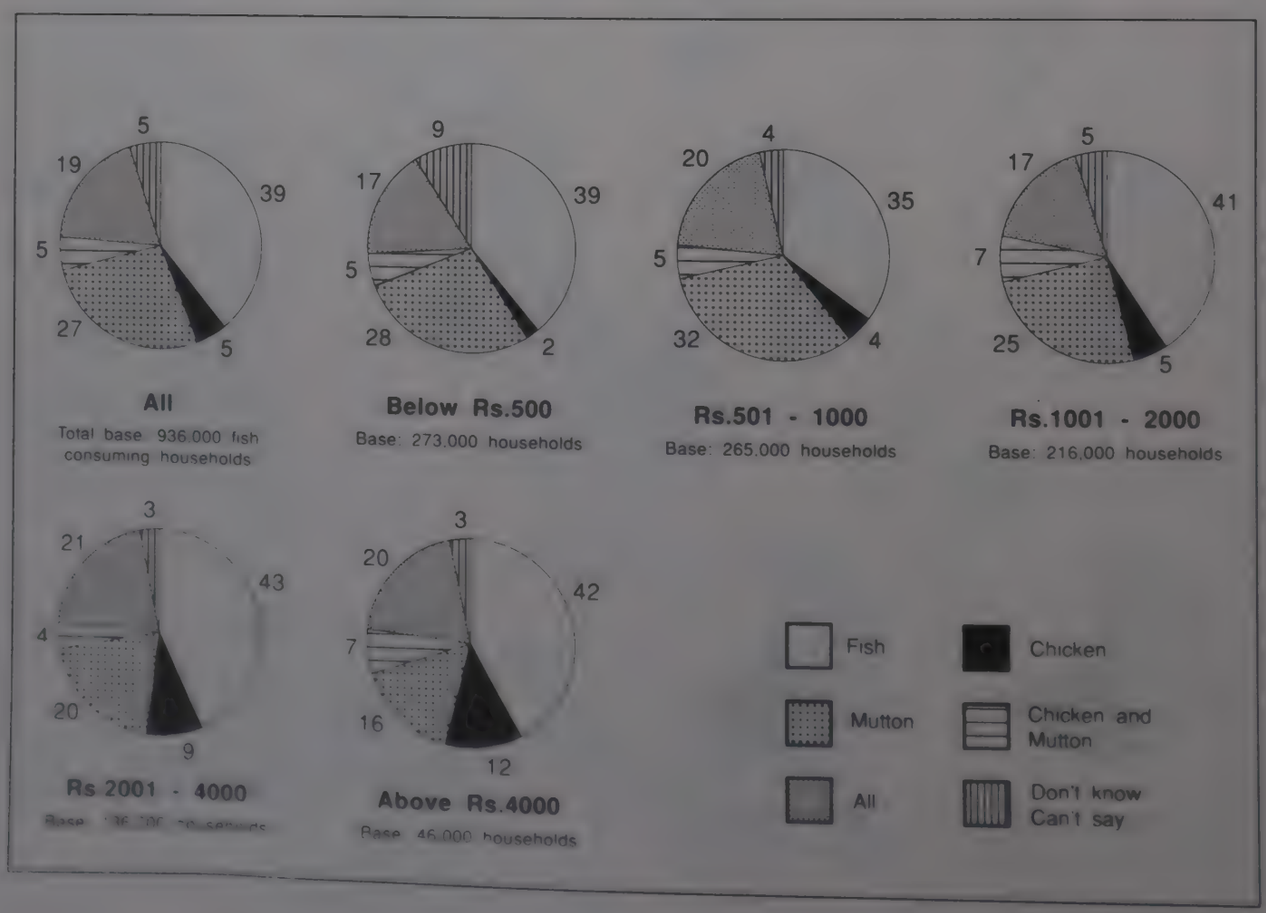


Fig 32. Perceptions relating to fish, mutton and chicken (%) 'IS GOOD FOR HEALTH'

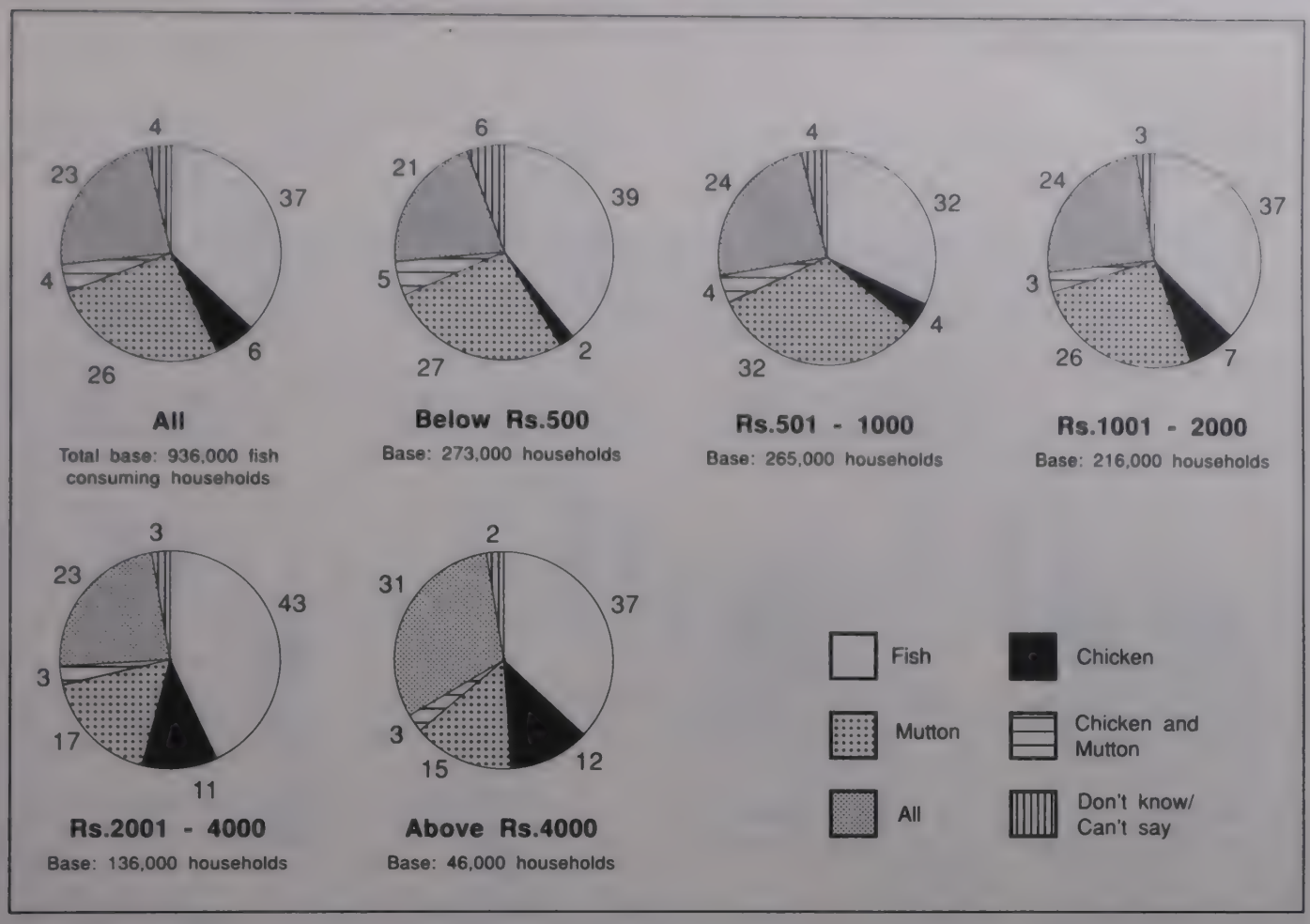


Fig 33. Perceptions relating to fish, mutton and chicken (%) 'IS EASIER TO COOK'

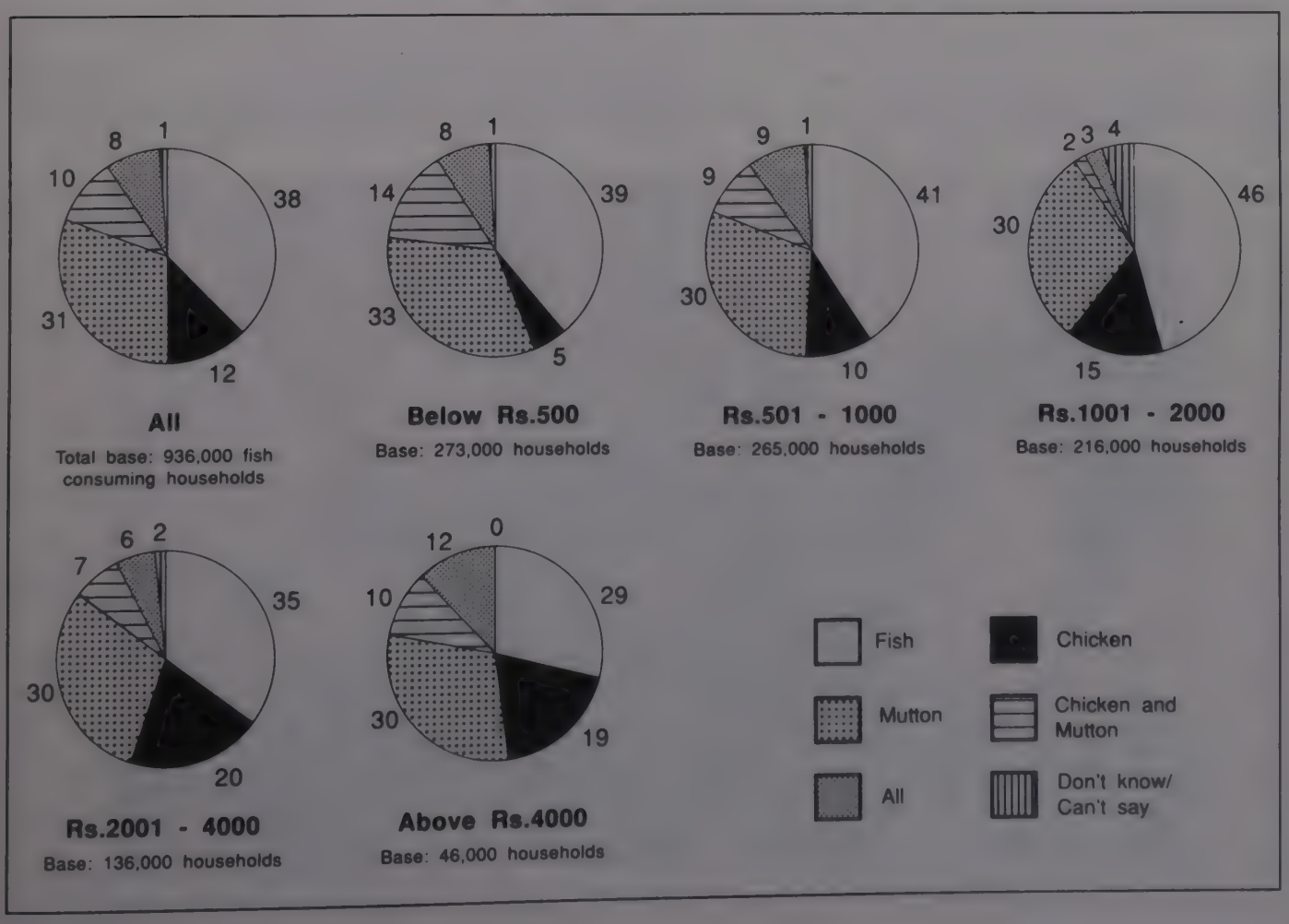
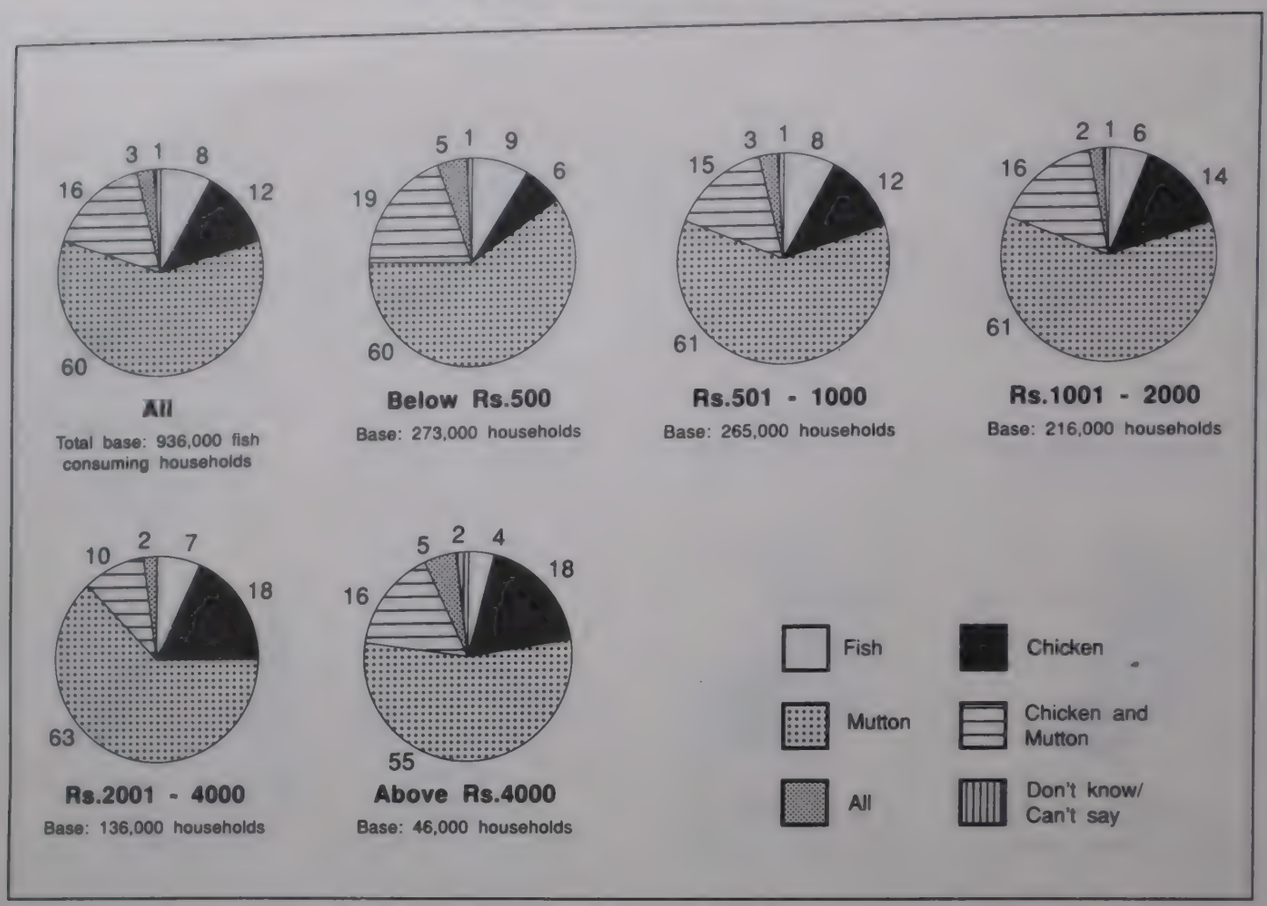


Fig 34. Perceptions relating to fish, mutton and chicken (%)
'IS EASIER TO CLEAN'



3.2 *Major reasons for buying more fish than chicken or mutton and* vice versa

It is estimated that 881,000 households consume more fish than chicken or mutton, while 365,000 households consume more chicken or mutton than fish.

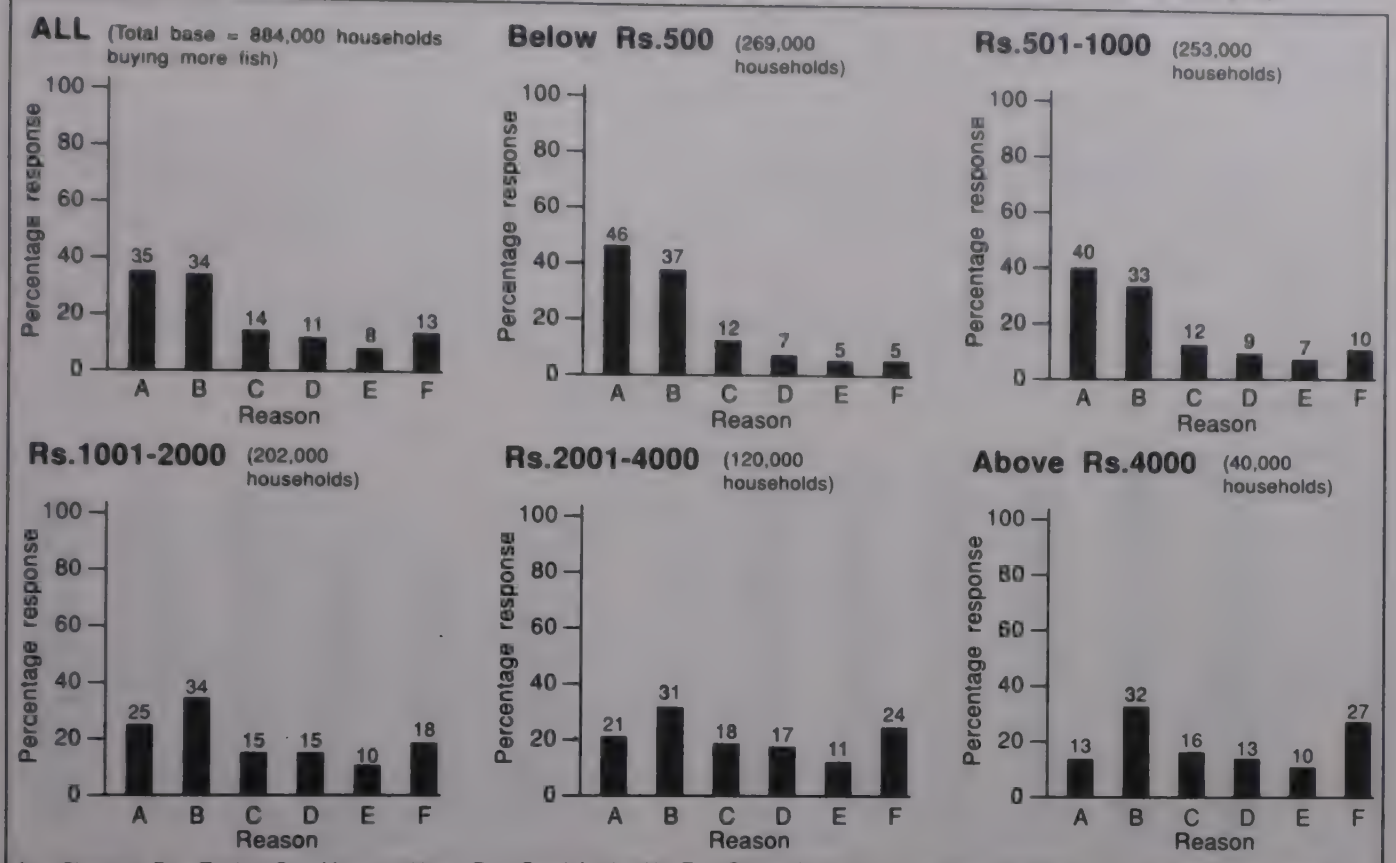
Not surprisingly, cheapness and taste are the major reasons for consumption of fish, followed by nutritional/health reasons. Economy is more important in the lower income groups, 40-46 per cent

Buyers waiting for their fish to be cleaned

as against 13-25 per cent in the middle and upper income groups. The emphasis on 'cheapness' becomes less with increasing monthly household incomes. Similarly, nutrition/health is more important in the middle and upper income groups (29-35 per cent) than in the lower income group (18-19 per cent).

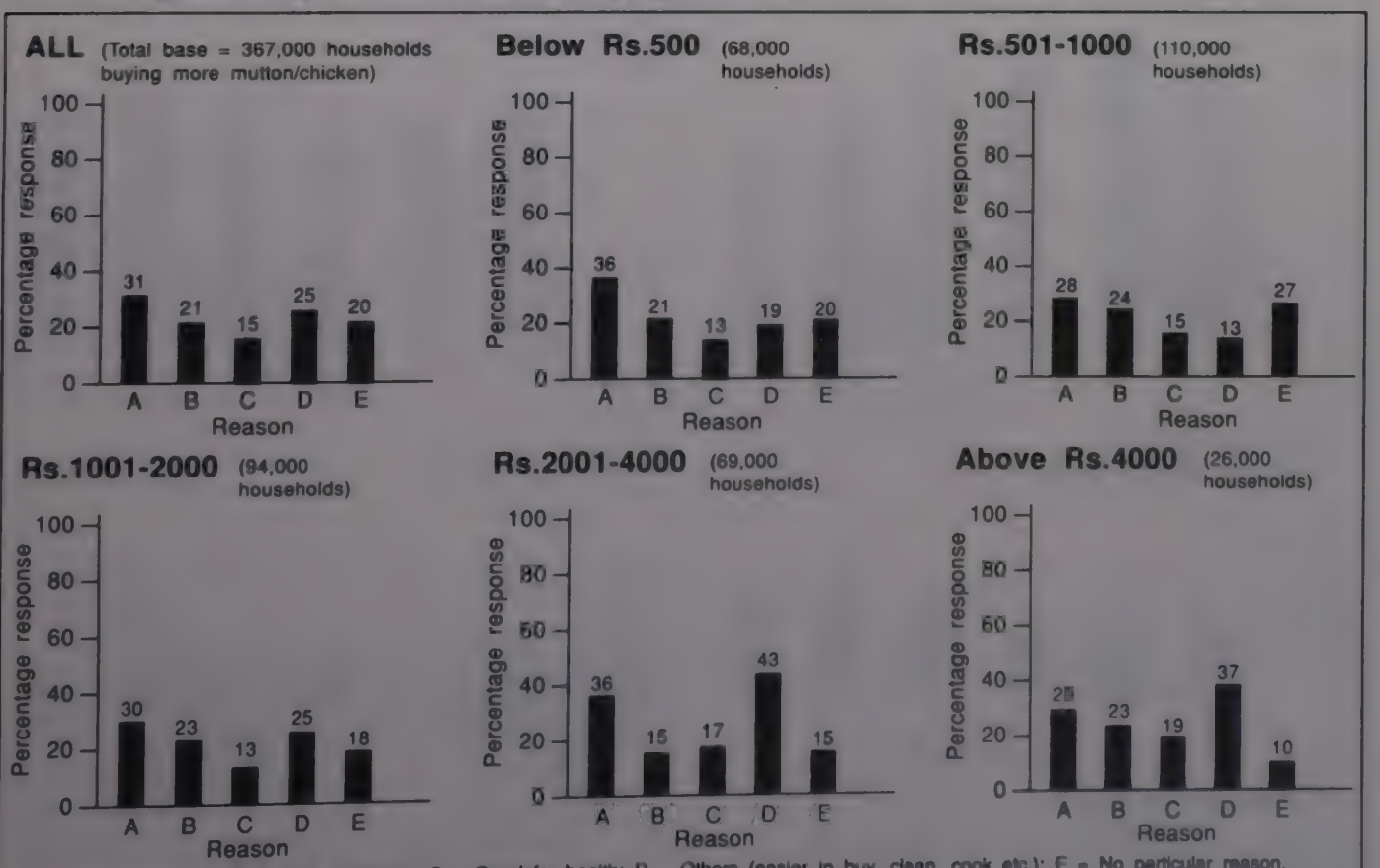
Mutton/chicken is preferred to fish mainly for reasons of 'family preference' and 'health' (see Figures 35 and 36).

Fig 35. Major reasons for buying more fish than chicken/mutton (%)


ALL (Total base = 884,000 households buying more fish)
35 34 14 11 8 13
Below Rs.500 (269,000 households)
46 37 12 7 5 5
Rs.501-1000 (253,000 households)
40 33 12 9 7 10
Rs.1001-2000 (202,000 households)
25 34 15 15 10 18
Rs.2001-4000 (120,000 households)
21 31 18 17 11 24
Above Rs.4000 (40,000 households)
13 32 16 13 10 27
Percentage response
Reason
A B C D E F

A = Cheaper; B = Tastier; C = More nutritious; D = Good for health; E = Others (easier to buy, clean, cook etc.); F = No particular reason.
Note: More than one answer given

Fig 36. Major reasons for buying more mutton/chicken than fish (%)


ALL (Total base = 367,000 households buying more mutton/chicken)
31 21 15 25 20
Below Rs.500 (68,000 households)
36 21 13 19 20
Rs.501-1000 (110,000 households)
28 24 15 13 27
Rs.1001-2000 (94,000 households)
30 23 13 25 18
Rs.2001-4000 (69,000 households)
36 15 17 43 15
Above Rs.4000 (26,000 households)
25 23 19 37 10
Percentage response
Reason
A B C D E

A = Family preference; B = More nutritious; C = Good for health; D = Others (easier to buy, clean, cook etc.); E = No particular reason.
Note: More than one answer given

3.3 *Fish products consumed in households*

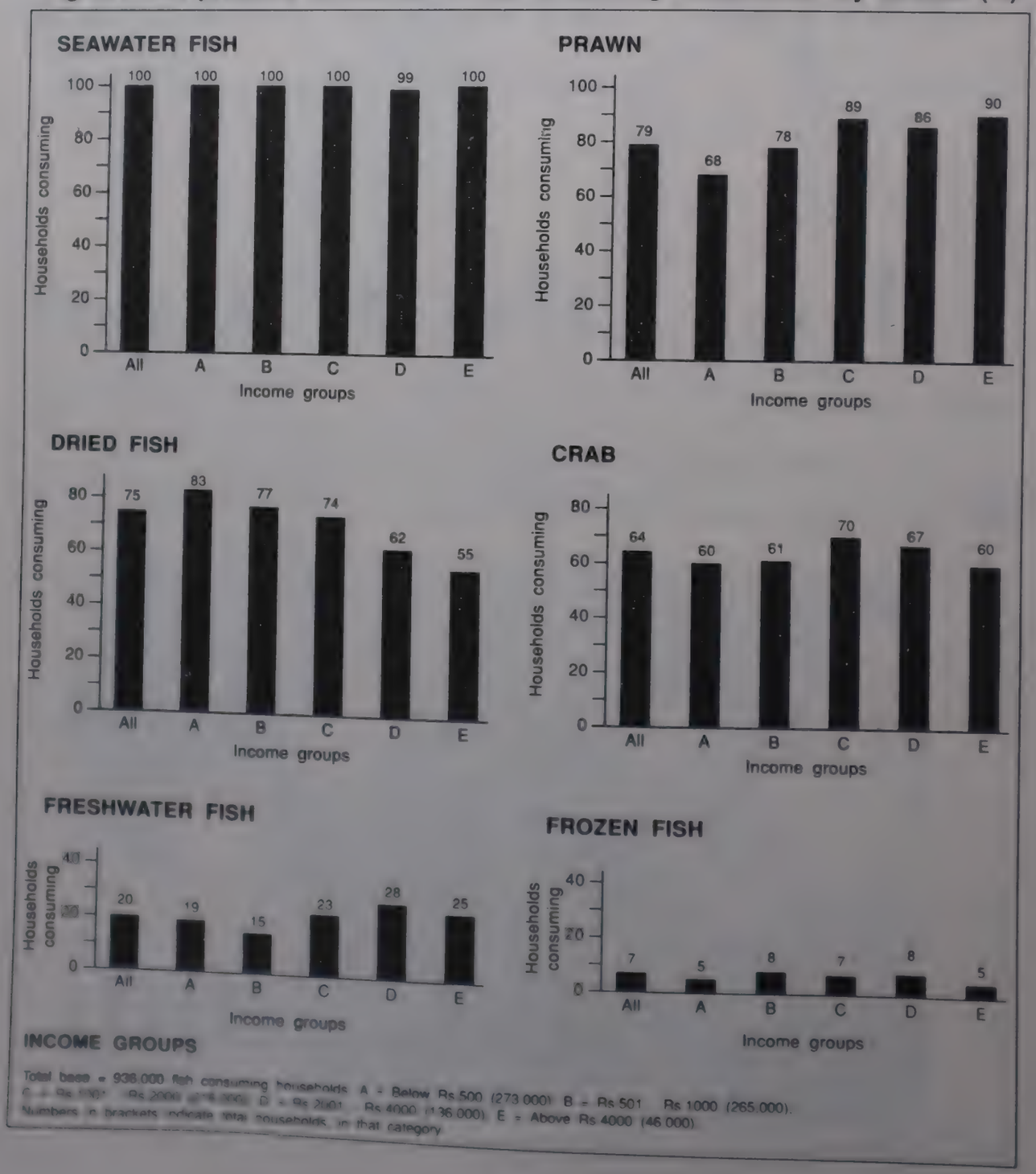
Respondents were asked to indicate the fish products consumed in their households in the last six months.

Seawater fish is consumed universally in fish-consuming households.

This was followed by consumption of Prawn (79 per cent), dried fish (75 per cent) and Crab (64 per cent). The consumption of Prawn and dried fish showed some variations by income, with Prawn being consumed more in the upper income groups (86 per cent and 90 per cent) and dried fish being consumed more in the lower income groups (77 per cent and 83 per cent). The consumption of seawater fish and Crab did not show any variation by income.

Only 20 per cent of fish-consuming households consumed freshwater fish, with a slightly higher consumption in the higher income groups (28 per cent, 25 per cent) (see Figure 37). Other data referring to aspects of consumption of other fish and marine products is given under Section 6.

Fig 37. Fish products consumed in fish consuming households: By income (%)


SEAWATER FISH
Households consuming
100 100 100 100 99 100
All A B C D E
Income groups
PRAWN
Households consuming
79 68 78 89 86 90
All A B C D E
Income groups
DRIED FISH
Households consuming
75 83 77 74 62 55
All A B C D E
Income groups
CRAB
Households consuming
64 60 61 70 67 60
All A B C D E
Income groups
FRESHWATER FISH
Households consuming
20 19 15 23 28 25
All A B C D E
Income groups
FROZEN FISH
Households consuming
7 5 8 7 8 5
All A B C D E
Income groups
INCOME GROUPS
Total base = 938,000 fish consuming households A = Below Rs.500 (273,000) B = Rs.501 Rs.1000 (265,000).
C = Rs.1001 Rs.2000 (254,000) D = Rs.2001 Rs.4000 (136,000) E = Above Rs.4000 (46,000)
Numbers in brackets indicate total households in that category

4. SEAWATER FISH

This section outlines the awareness of the various seawater fish, the purchase of seawater fish, preference for specific varieties and the frequency, quantity and method of consumption of the preferred fish.

4.1 *Awareness of seawater fish*

Respondents were asked to name the seawater fish they were aware of. The first mentioned was recorded under 'Top of the Mind', the rest under 'Spontaneous'. They were then asked whether they were aware of specific varieties of seawater fish. These were recorded under 'Aided' awareness.

Bream (36 per cent) and Seer (33 per cent) score the highest on 'Top of the Mind' awareness. There is a variation by income, with 44 per cent and 40 per cent in the lower income groups indicating an awareness of Bream and 54 per cent and 60 per cent in the upper income groups indicating an awareness of Seer (see Figure 38).

'Spontaneous' responses indicate a fairly high level of awareness of at least 11 varieties of seawater fish, indicating a high level of involvement — 80 per cent of fish consumers are aware of Bream and 73 per cent of Seer. Again, there are marked differences by income, with Seer having a near universal (97 per cent) awareness in the above Rs.4,000 income group.

Further, there are certain types which have higher awareness levels in the lower income group: Bream, Mackerel, Whitefish, Anchovy, Sardine, Lizardfish, Goatfish and Silverbelly. Those having higher awareness levels in the upper income groups are Seer, Shark, Pomfret and Seaperch.

The total awareness which emerged **after assistance** indicates a high level of awareness of all varieties. The differences by income are not so marked. More than half the consumers of seafish are aware of 17 varieties of fish. While the awareness of Bream and Seer is nearly universal, there is quite a high relative awareness of Anchovy, Shark, Pomfret, Whitefish, Mackerel, Seaperch, Goatfish and Sardine (74 per cent-89 per cent). The varieties of which there is relatively lower awareness are Ray (45 per cent), Eel (36 per cent), Jewfish (Sciaenids) (34 per cent). Tuna (27 per cent) and the Barracuda (17 per cent) (see Figure 38 below and Tables 1 and 2 overleaf).

Fig 38. 'Top of the Mind' awareness of seawater fish (%): By consumers of seawater fish

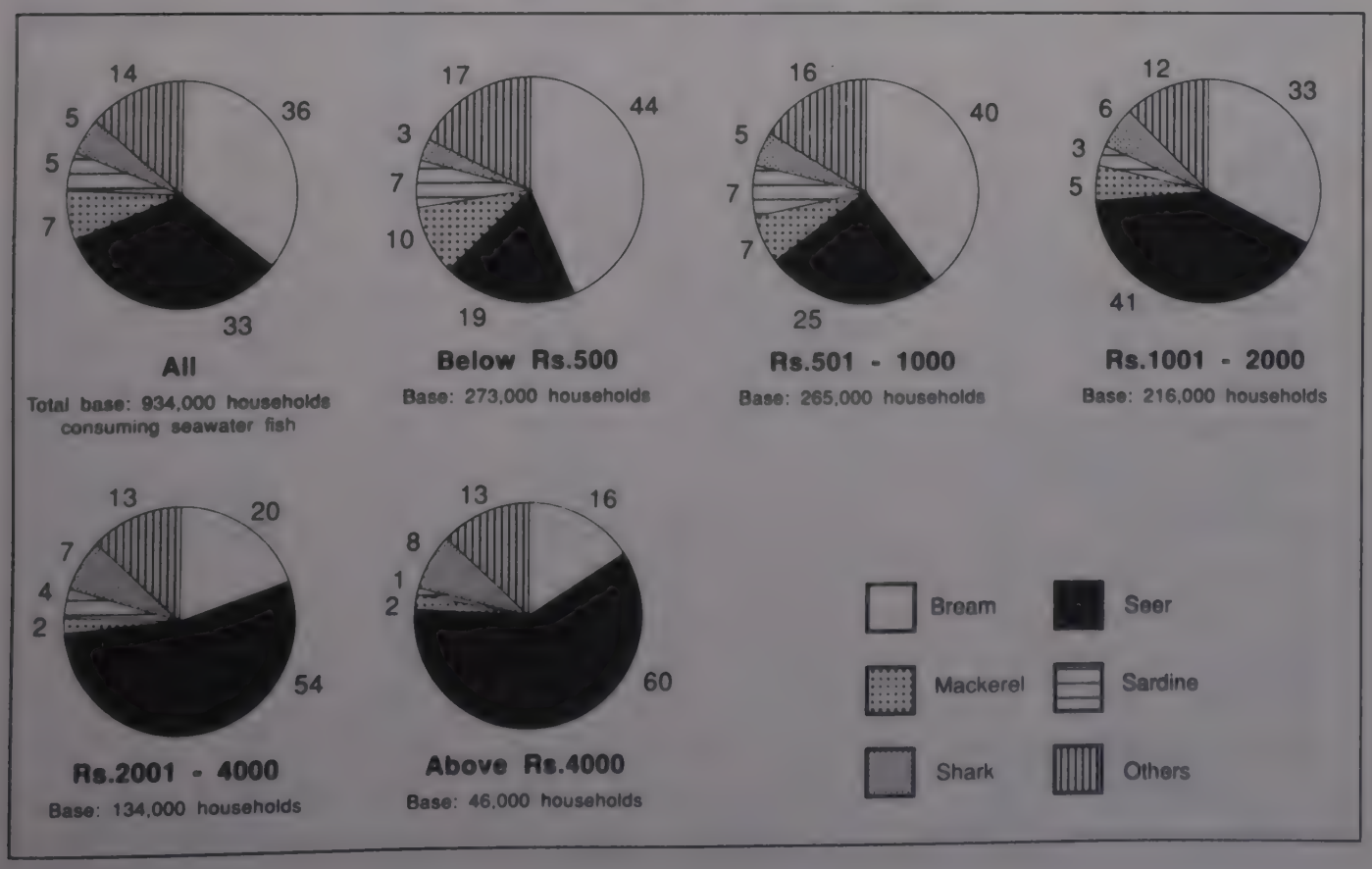


Table 1. 'Spontaneous' awareness of seawater fish (%)

	All	*Below Rs.500*	*Rs.501-1000*	*Rs.1001-2000*	*Rs.2001-4000*	*Above Rs.4000*
Bream	82	85	83	84	71	76
Seer	73	57	69	82	89	97
Shark	39	30	38	42	49	51
Mackerel	38	50	43	31	20	29
Whitefish	36	42	37	33	30	38
Anchovy	32	38	32	27	25	31
Sardine	31	41	32	25	19	39
Lizardfish (Saurida sp.)	29	35	32	28	20	19
Goatfish	29	34	31	23	23	26
Pomfret	29	17	24	35	44	54
Silverbelly	28	36	31	22	16	19
Seaperch	24	19	19	27	35	39
Ribbonfish	17	19	20	13	10	19
Horse mackerel (Carangids)	11	11	11	11	4	14
Sole/Flatfish	9	7	10	9	8	12
Indian salmon (Polynemids)	9	6	8	9	13	16
Base : All households consuming seawater fish ('000's)	934	273	265	216	134	46

Table 2. Total 'aided' awareness of seawater fish (%)

	All	*Below Rs.500*	*Rs.501-1000*	*Rs.1001-2000*	*Rs.2001-4000*	*Above Rs.4000*
Seer	97	94	96	99	99	100
Bream	96	96	98	97	94	91
Anchovy	89	90	91	90	85	89
Shark	86	82	86	90	91	83
Pomfret	84	83	79	86	90	91
Whitefish	84	88	82	85	80	84
Mackerel	81	90	82	78	69	70
Seaperch	79	77	78	81	80	89
Goatfish	75	78	76	72	70	71
Sardine	74	80	74	70	64	79
Ribbonfish	70	69	73	67	67	75
Lizardfish (Saurida sp.)	69	72	69	70	65	61
Catfish	68	71	70	68	64	59
Silverbelly	67	74	70	64	55	48
Horse mackerel (Carangids)	57	57	58	56	55	52
Indian salmon (Polynemids)	51	46	48	56	58	52
Sole/Flatfish	51	49	52	50	51	56
Ray	45	45	46	41	47	42
Eel	36	35	35	37	39	33
Tuna	27	25	26	27	33	23
Barracuda	17	16	15	20	20	10
Base: All households consuming seawater fish ('000's)	934	273	265	216	134	46

4.2 *Purchase of seawater fish*

Respondents were asked to indicate the specific varieties of seawater fish they had bought for their housholds in the last six months.

The purchase patterns were similar to those of awareness. Bream is the most bought fish (86 per cent), followed by Seer (68 per cent). Once again there is marked differences by income, with 90-94 per cent of those in the upper income groups purchasing Seer.

Purchase of fish is, however, not restricted to the two varieties alone. There are as many as nine other varieties consumed by at least a third of the consumers of seawater fish. These are Whitefish, Anchovy, Mackerel, Sardine, Shark, Goatfish, Lizardfish (Saurida Sp.), Silverbelly and Pomfret. Again, there are differences by income, with there being a preference for Whitefish, Anchovy, Mackerel, Sardine, Goatfish, Lizardfish (Saurida Sp.) and Silverbelly among the lower income groups and a preference for Shark (57 per cent), Pomfret (63 per cent) and Seaperch (41 per cent) in the upper income group.

An analysis of awareness and purchase indicates that though there is a high awareness of a large number of fish, purchase is restricted to a few, suggesting that the preference of fish is very, very specific and that there are, possibly, very specific reasons for buying specific varieties.

'Economic reasons' are important and this has been emphatically brought out by the specific preference for specific varieties in specific income groups. The lower income groups prefer slightly cheaper varieties, the upper income groups prefer the more expensive fish. But there are other reasons too behind making a decision, and that is clearly reflected in the fact that there is low purchase of certain varieties even though the awareness is high, as in the case of Catfish, Horse mackerel (Carangids), Indian salmon (Polynemids), Flatfish, Ray, Eel, Jewfish (Sciaenids), all of which have awareness levels ranging between 34-68 per cent but a purchase incidence ranging only between 6 and 17 per cent (see Table 3).

Table 3. Purchase of seawater fish during last 6 months

	Total No. of purchasing households ('000)	*Total % of purchasing households*	*Below Rs.500 %*	*Rs.501-1000 %*	*Rs.1001-2000 %*	*Rs.2001-4000 %*	*Above Rs.4000 %*
Seer	635	68	47	59	84	90	94
Bream	803	86	89	88	89	79	86
Anchovy		54	60	49	55	53	45
Shark	383	41	27	33	53	59	57
Pomfret	308	33	19	23	43	57	63
Whitefish	504	54	62	48	53	54	47
Mackerel	430	46	56	47	41	35	32
Seaperch		29	20	20	39	49	41
Goatfish	374	40	46	39	39	35	39
Sardine	411	44	54	45	39	32	37
Ribbonfish		28	28	28	30	26	20
Lizardfish (Saurida sp.)		37	42	36	37	34	29
Catfish		17	19	15	17	22	10
Silverbelly		36	47	33	30	28	20
Horse mackerel (Carangids)		14	12	11	16	20	12
Indian salmon (Polynemids)		15	9	12	20	22	20
Sole/Flatfish		17	15	15	20	20	16
Ray		7					
Eel		6					
Tuna		4					
Barracuda		4					
Base: All households consuming seawater fish ('000's)		934	273	265	216	134	46

4.3 *The most preferred fish*

Respondents were asked to indicate the most preferred fish, the second most preferred fish and the third most preferred fish. These were then given weights of three, two and one respectively and the weighted preference of fish was arrived at. The respondents were also asked to indicate their reasons for preferring a fish.

Though the respondents were asked to indicate their preference for fish type from both seawater and freshwater fish, the overwhelming preference is for seawater fish with the Bream and the Seer scoring way over the others (1.57 and 1.19 respectively). There is again a difference by income, with Seer getting a very high score in the upper income group (1.81). The other fish types for which marked preferences were indicated are Sardine, Mackerel, Whitefish, Goatfish, Shark and Pomfret. Amongst these, the Shark and Pomfret have higher ratings in the upper income group and the rest in the lower income group.

The reasons for preferring a specific type of fish vary, but the main reason which emerges is 'taste' (68-85 per cent), followed by 'economy'. 'Economy' really matters only for the cheaper varieties consumed in the lower income group — Bream (38 per cent), Sardine (53 per cent), Mackerel (31 per cent), Whitefish (39 per cent) and Goatfish (33 per cent) — which again ties in with the finding that economy is a major factor in the lower income group.

Seer, Shark and Pomfret respectively are preferred on account of fewer bones by 33 per cent, 23 per cent and 25 per cent of those consuming fish. This along with the fact that these varieties are really preferred by the upper income group, could suggest the need for bone-free fish in this category (see Figures 39 and 40).

Fig 39. Most preferred fish (weighted preference) amongst all fish consumers

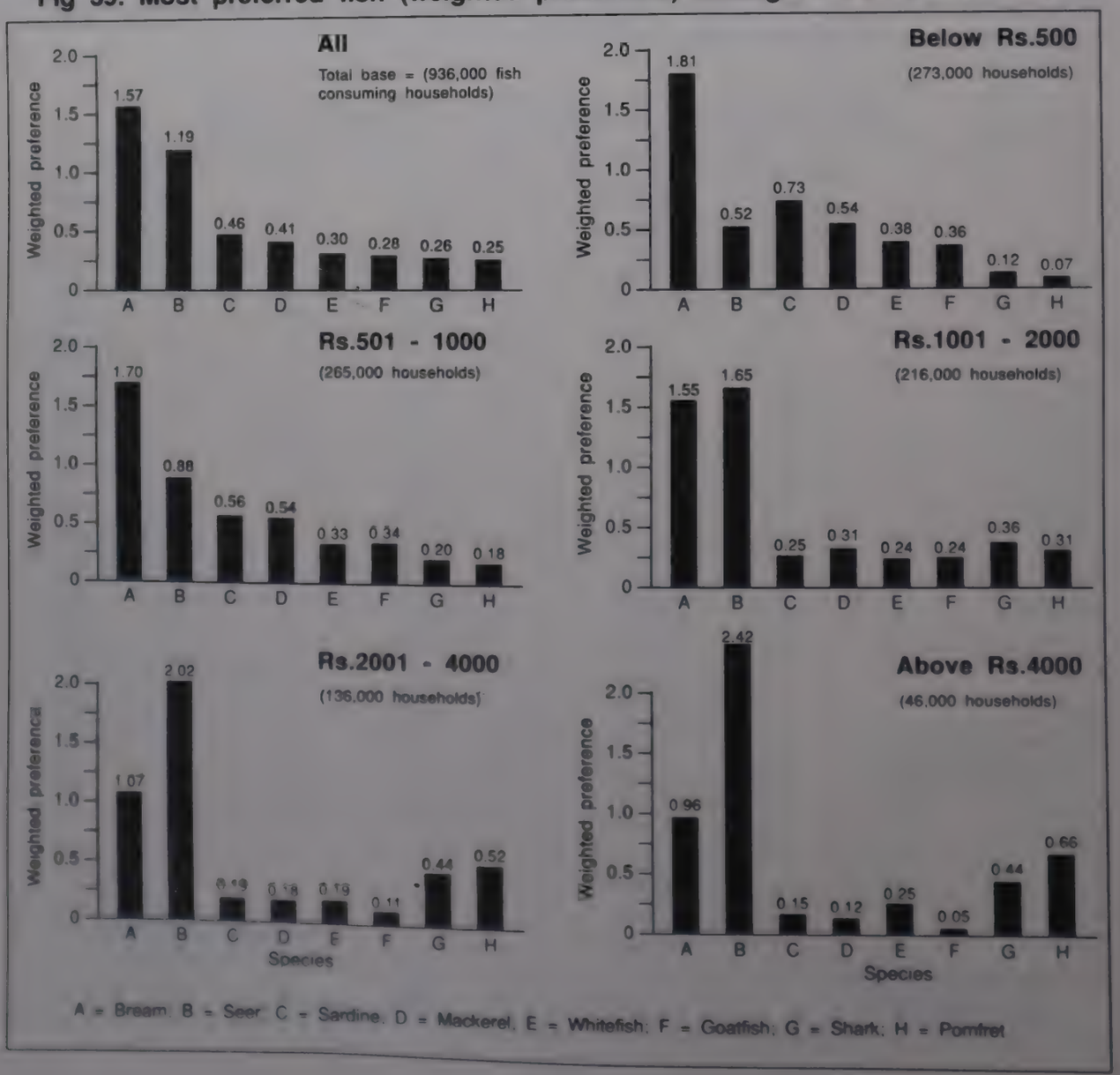
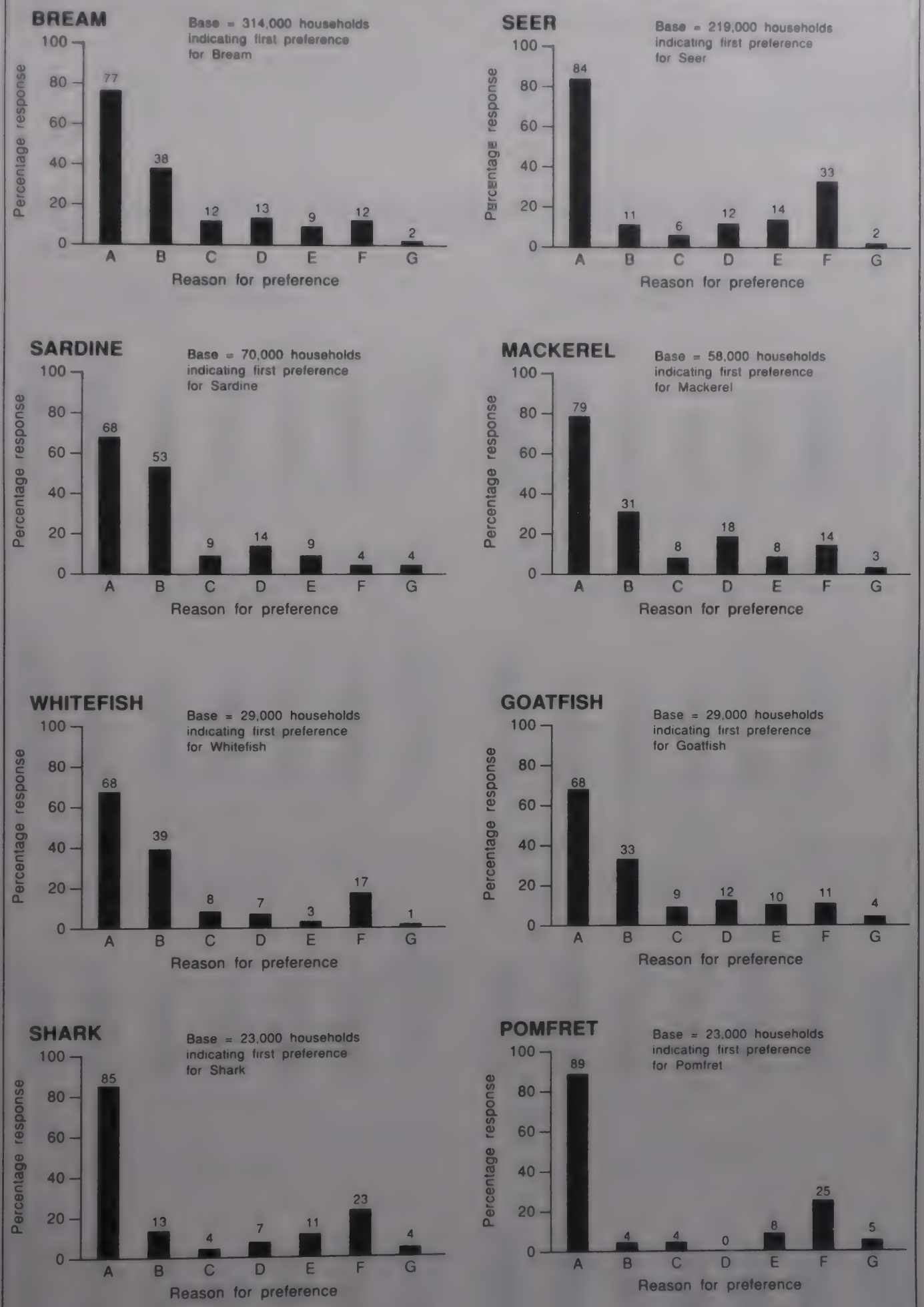


Fig 40. Reasons for preferring a fish most (%)



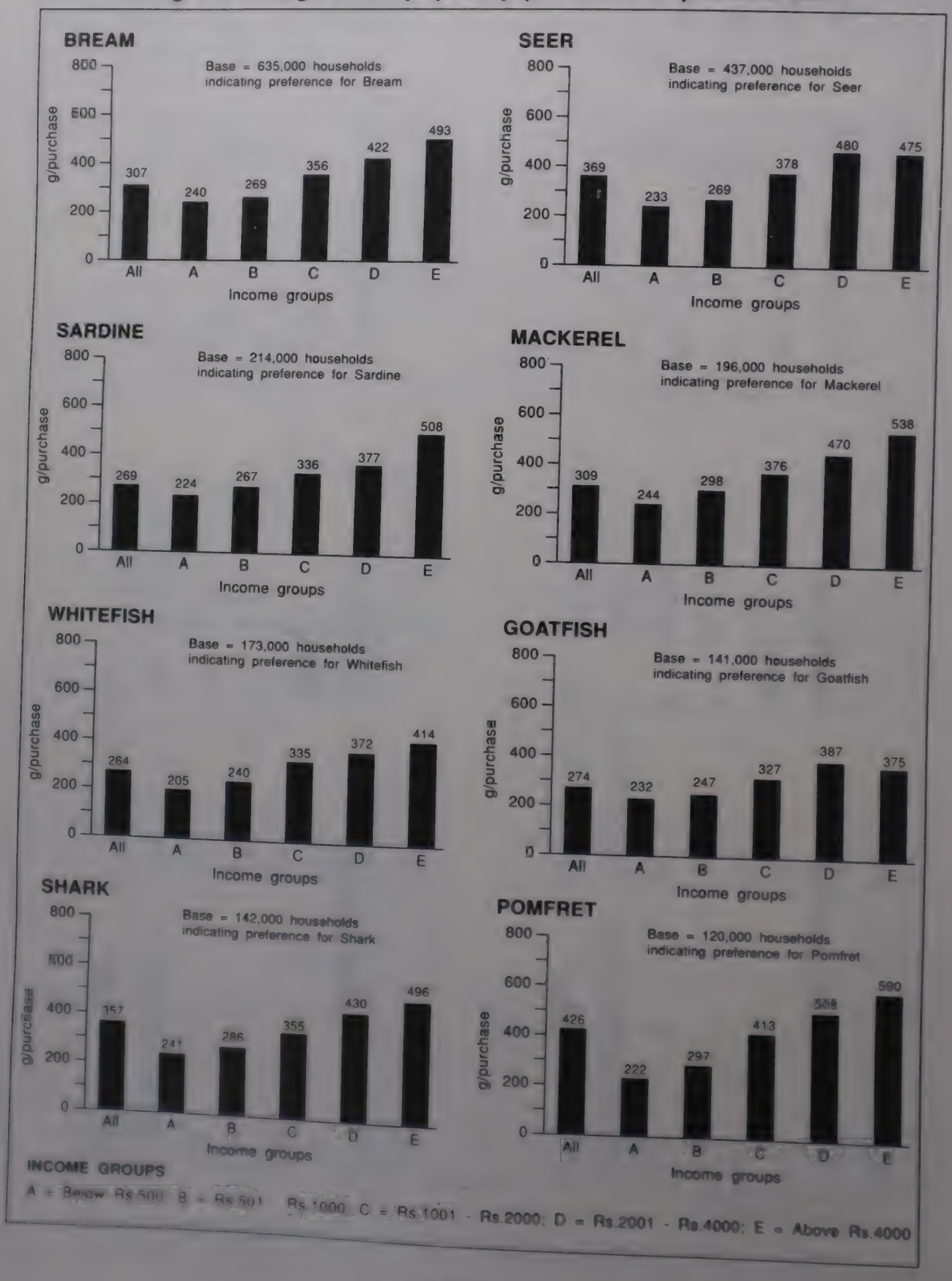
REASONS FOR PREFERENCE

A = Taste; B = Cheaper; C = Good value; D = Easily available; E = Ease of preparation, F = Fewer bones; G = Health/Nutrition

4.4 *Purchase of preferred fish*

Respondents were asked how often they bought the most preferred fish, the second most and the third most in an average month, and what quantities were bought on an average on each occasion. Based on this data, averages were worked out for the frequency of purchase, and the average quantity purchased (see Figures 41 and 42). The minimum consumption of the preferred varieties were also worked out from this data for Madras city.

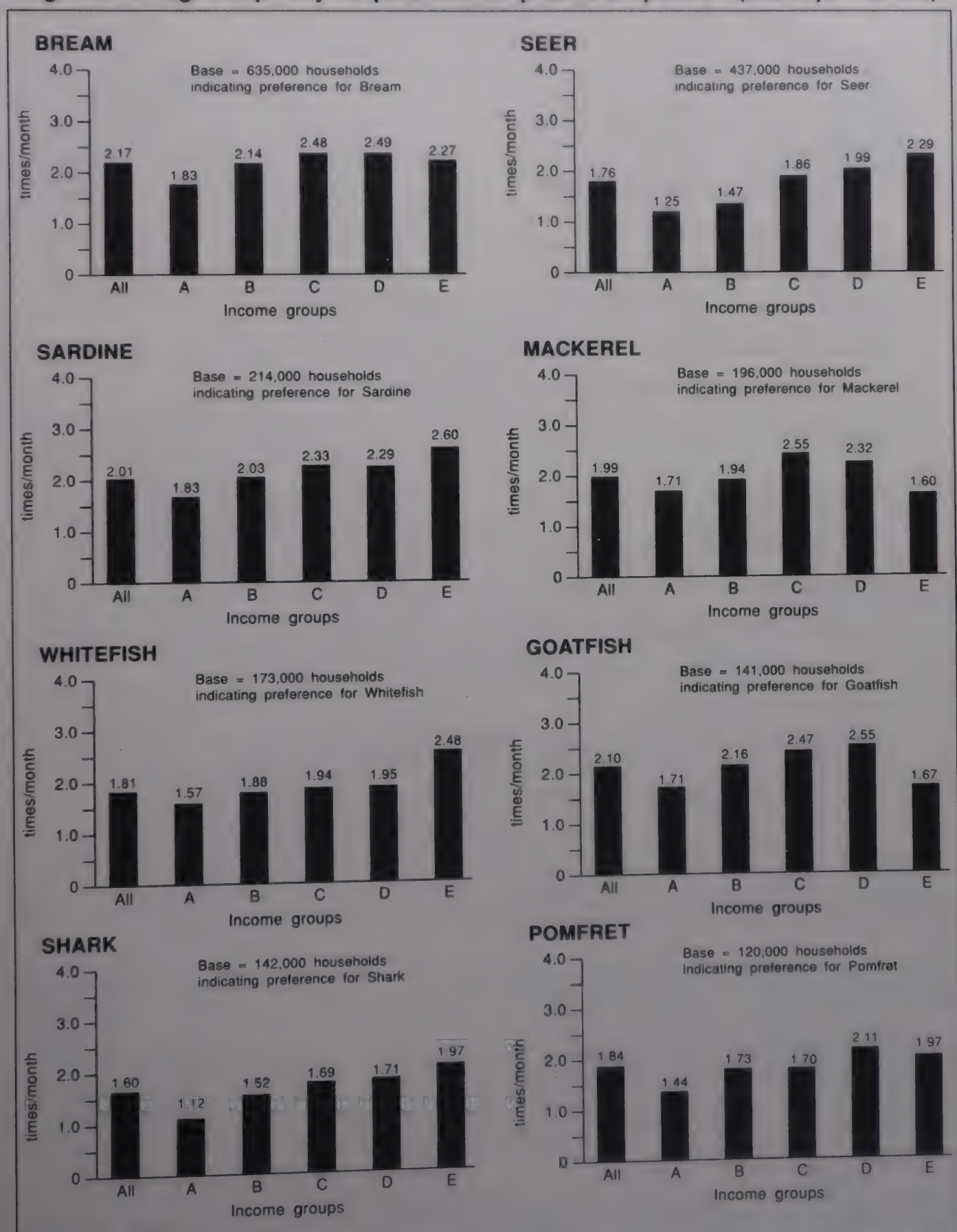
Fig 41. Average monthly quantity purchased of preferred fish



The average frequency of purchase of the preferred fish is about twice a month. On an average, the quantities indicated as being bought on each occasion is a little over a quarter of a kilo in the lower income group and about half a kilo, or a little more, in the upper income group.

There is some variation in quantities by the type of fish too. Pomfret and Seer are bought in larger quantities than the others. However, in talking about quantities, it should be remembered that these are at best approximations, as fish is, by and large, sold in heaps (*kooru*); only larger fish, like Seer and Shark, are sold by weight.

Fig 42. Average frequency of purchase of preferred species (times per month)



INCOME GROUPS

A = Below Rs.500; B = Rs.501 - Rs.1000; C = Rs.1001 - Rs.2000; D = Rs.2001 - Rs.4000; E = Above Rs.4000

Of the respondents who bought the most popular varieties, Bream and Seer, in the last six months, 79 per cent and 69 per cent indicated the respective fish to be most, second or third preferred; based on this, it can be confidently stated that a minimum of about 285,000 kg of Seer and about 423,000 kg of Bream would be required in an average month by Madras city (see Table 4). Considering that about 120 t of fish is consumed in Madras a day (see Section 2.2), Seer and Bream would together appear to account for around 20 per cent of the consumption in the city.

Table 4. Estimated total consumption of Seer and Bream in an average month

Seer	*Preference level*		
	1	*2*	*3*
No. households indicating preference ('000s):	291	100	46
Quantity purchased at preference level (g)	383	335	352
Frequency of purchase at preference level	1.86	1.66	1.36
Minimum quantity purchased per month at preference level (t)	207	56	22
Total quantity purchased (t)	285		
Percentage of total consumption (120 t/day x 30 days: 3,600 t)	**8%**		
Bream	*Preference level*		
	1	*2*	*3*
No. households indicating preference ('000s):	313	205	117
Quantity purchased at preference level (g)	295	314	328
Frequency of purchase at preference level	2.33	2.03	2.01
Minimum quantity purchased per month at preference level (t)	215	131	77
Total quantity purchased (t)	423		
Percentage of total consumption (120 t/day x 30 days: 3,600 t)	**12%**		

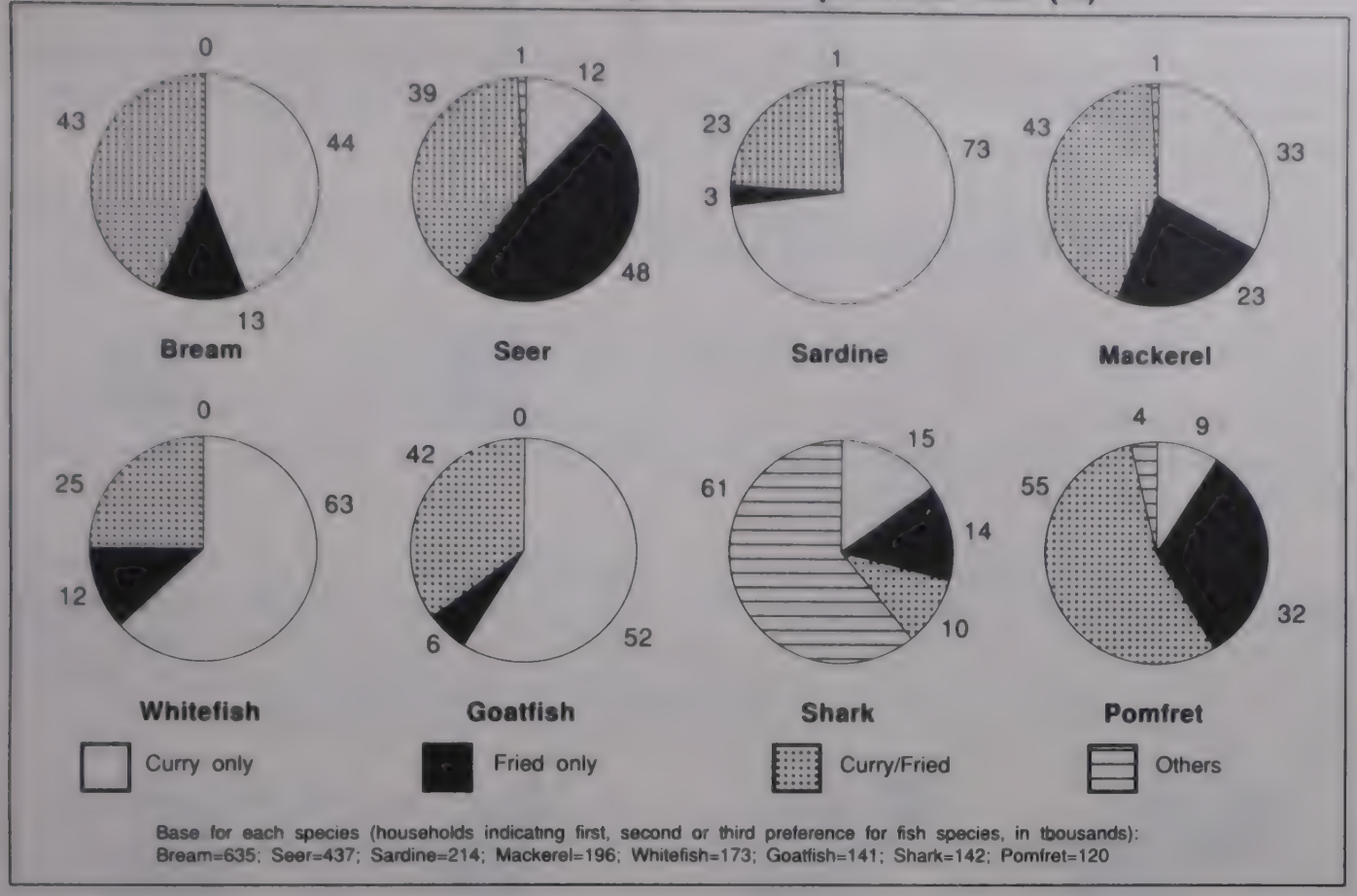
4.5 *Method of preparation of preferred fish*

Respondents were asked to indicate the most preferred method of preparing the fish they most preferred, as well for their second and third choices.

The most preferred methods of preparation are the 'curry' and the 'fried' form. The fried form is preferred more in the upper income group and the curry in the lower income group. The preference for the 'curry' form in the lower income group could be an indication of 'fish curry' being used as a substitute for *dal* (lentils) and vegetables, with 'rice and fish curry' comprising a full meal.

While all varieties of preferred fish are fried, Seer an Pomfret are predominantly fried. The Shark is the only variety which was predominantly indicated as being steamed and scrambled (see Figure 43 on facing page).

Fig 43. Method of preparation of preferred fish (%)



Base for each species (households indicating first, second or third preference for fish species, in thousands): Bream=635; Seer=437; Sardine=214; Mackerel=196; Whitefish=173; Goatfish=141; Shark=142; Pomfret=120

5. AWARENESS AND PURCHASE OF FRESHWATER FISH

Though consumption of freshwater fish is low, awareness of at least three varieties is fairly high (58-74 per cent). However, incidence of purchase of the same varieties is much lower (38-50 per cent). But the fact that 'Golden Fish' (a farm-grown Tilapia) publicized the maximum, is purchased most (50 per cent) might be an indication of the role publicity/the media could play in increasing consumption of fish/specific varieties of fish in the future (see Table 5).

Table 5. Awareness and purchase of freshwater fish (%)

	Awareness	*Purchase*
'Golden Fish'	74	50
Exotic Carp	66	45
Mullet	58	38
Rohu	19	12
Catla	14	5
Hilsa	9	5
Mirgal	8	2

Base: Households consuming freshwater fish: 190,000

6. FREQUENCY OF CONSUMPTION OF OTHER MARINE PRODUCTS

Data on consumption of other marine products, like Prawn, dried fish, Crab, frozen fish and Mussel/Clam, have already been given under Section 3.3 (see Figure 37). Respondents indicating consumption of other marine products were asked how often, on an average, in a month they consumed these.

From their response it would seem that there is a very high frequency of consumption — at least once a week.

However, the high incidence of consumption of frozen fish (packaged fish) could be misleading; it is quite probable that consumers perceive all 'fish on ice' as 'frozen fish' (see Table 6).

Table 6. Frequency of consumption of other fish products

	No. of times in a month	*No. of households consuming the product ('000's)*
Prawn	4.27	742
Dried fish	4.29	699
Crab	4.88	595
Frozen (packaged) fish	3.73	64
Mussel/Clam	4.69	29

7. PURCHASE OF FISH

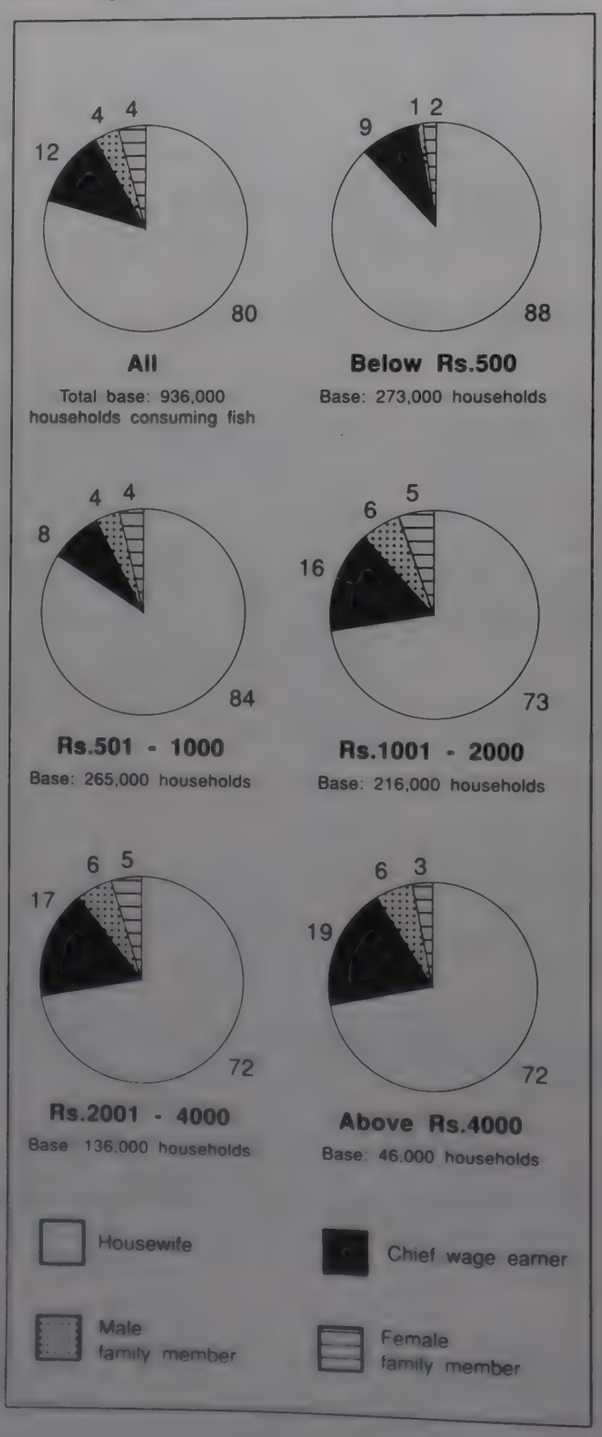
Respondents were asked a number of questions to determine the purchase process. These questions essentially pertained to the 'decision-maker', 'the point of decision', 'factors influencing decision making', and 'the availability of the variety decided upon'.

They were also asked details of the specific location from where they purchased their fish, how far it was from their homes and whether they would prefer a change in location.

7.1 *Decision-maker deciding on variety of fish to be purchased*

The decision-maker in eight out of ten fish-consuming households is the **housewife**. The incidence in households with income upto Rs. 1,000 is slightly higher — nine out of ten — than in those households with incomes over Rs. 1,000.

Fig 44. Decision-maker deciding on variety to be purchased (%)



The decision-maker is the chief wage earner in only one out of ten households in households with incomes below 1,000 Rs./month and two out of ten in households with monthly incomes over Rs. 1,000 (see Figure 44).

7.2 *Point of decision on variety of fish to be purchased*

In nine of ten households, the decision is taken only after seeing the availability. There is, however, a slightly higher incidence of pre-deciding the variety in the upper income groups (23-24 per cent).

Those pre-deciding on the variety of fish were further asked about the availability of the deciding variety and their response if it was not available. About a third of those pre-deciding in the lower income group and about half to two-thirds in the upper income group indicated uncertain availability of the pre-decided fish. However, what is important to note is that in the lower income group, the remedial action is to buy from whatever is available in more than three-fourths of the cases, whereas this is so only in a little over half the cases in the upper income group. This would indicate that those in the upper income group are more rigid in their pattern of selecting a variety of fish (see Figures 45-47 on facing page).

7.3 *Factors influencing decision on variety of fish to be purchased at point of purchase*

The major factor which emerges across all income groups is 'taste'. Taste is almost universally mentioned (93 per cent). Freshness is the second most important factor, with

Fig 45. Point of decision on variety of fish to be purchased (%)

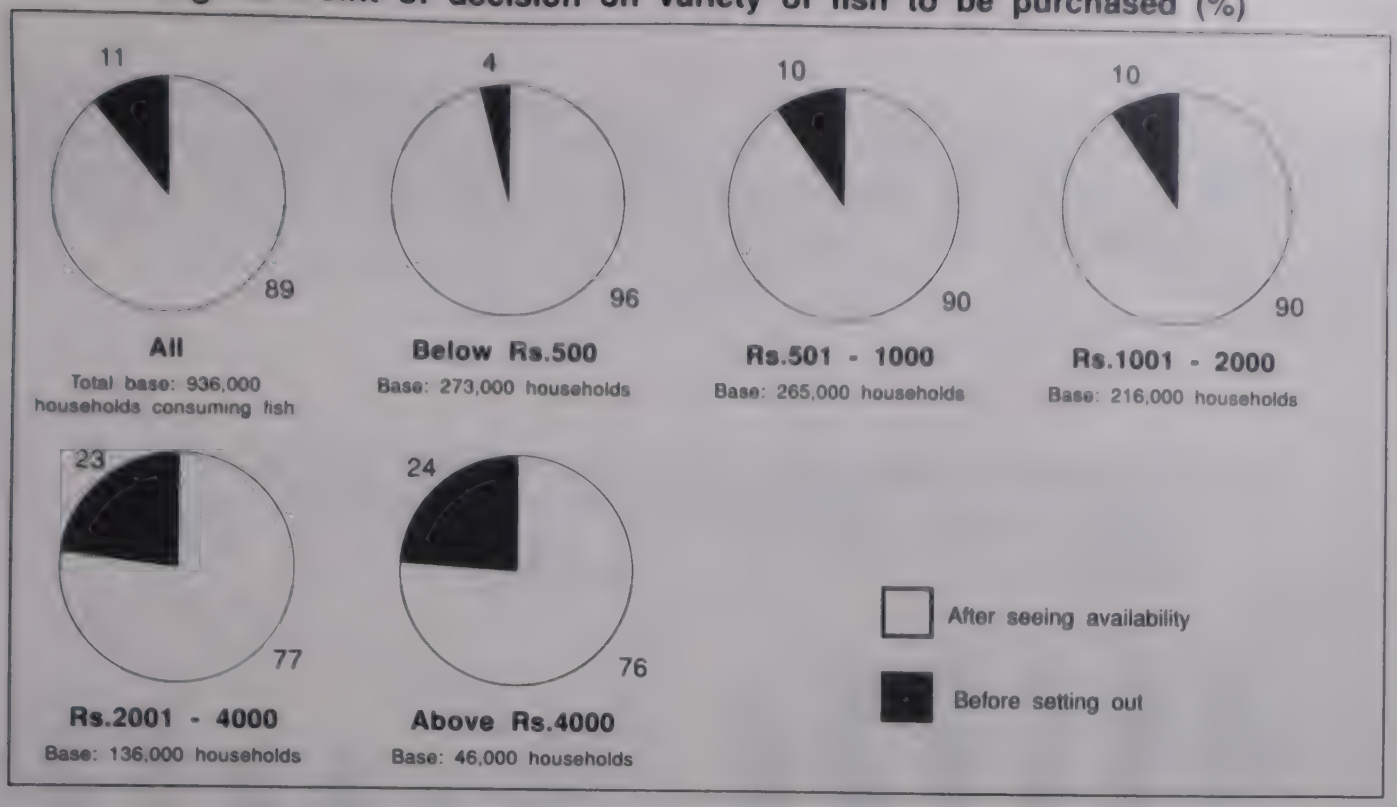


Fig 46. Availability of fish decided on for purchase (%)

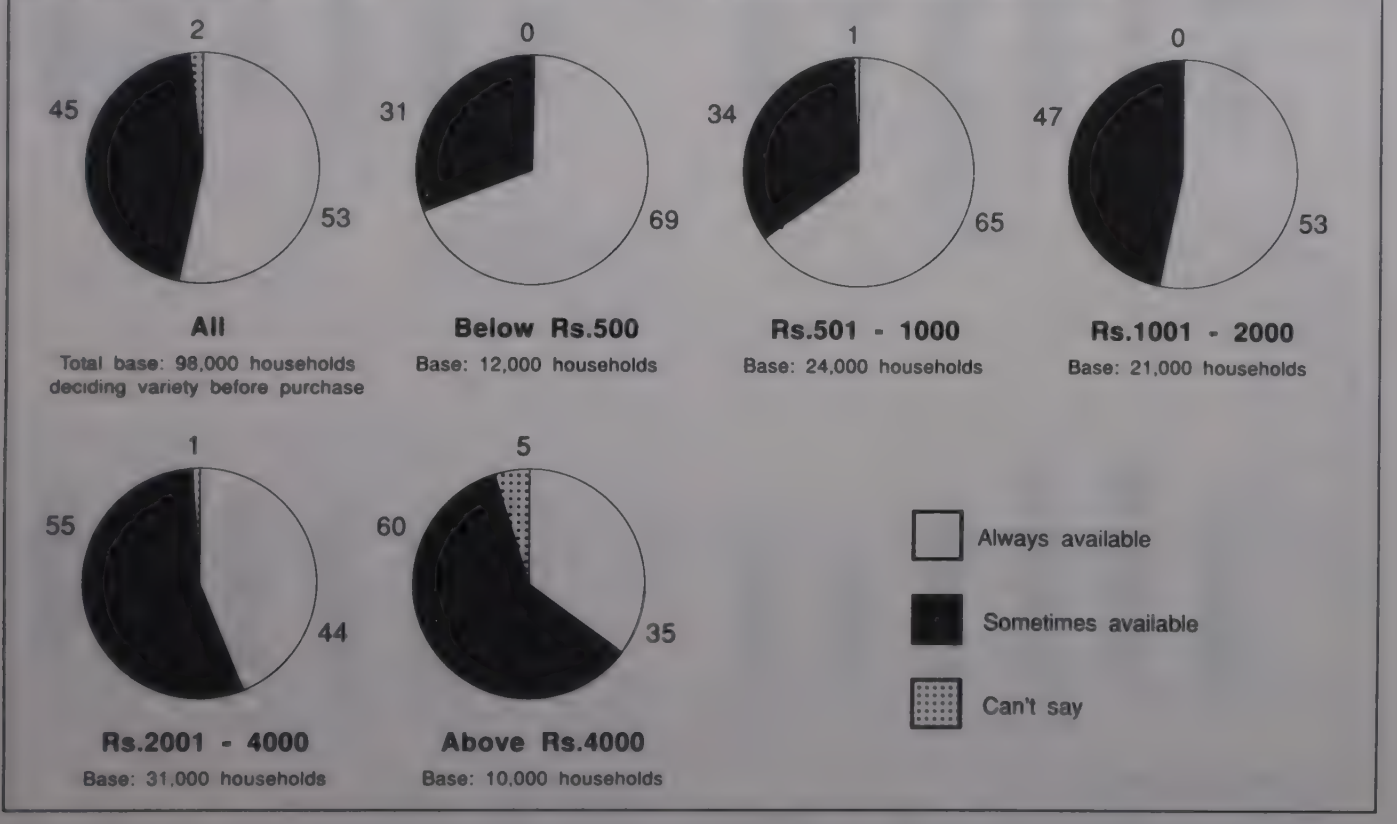
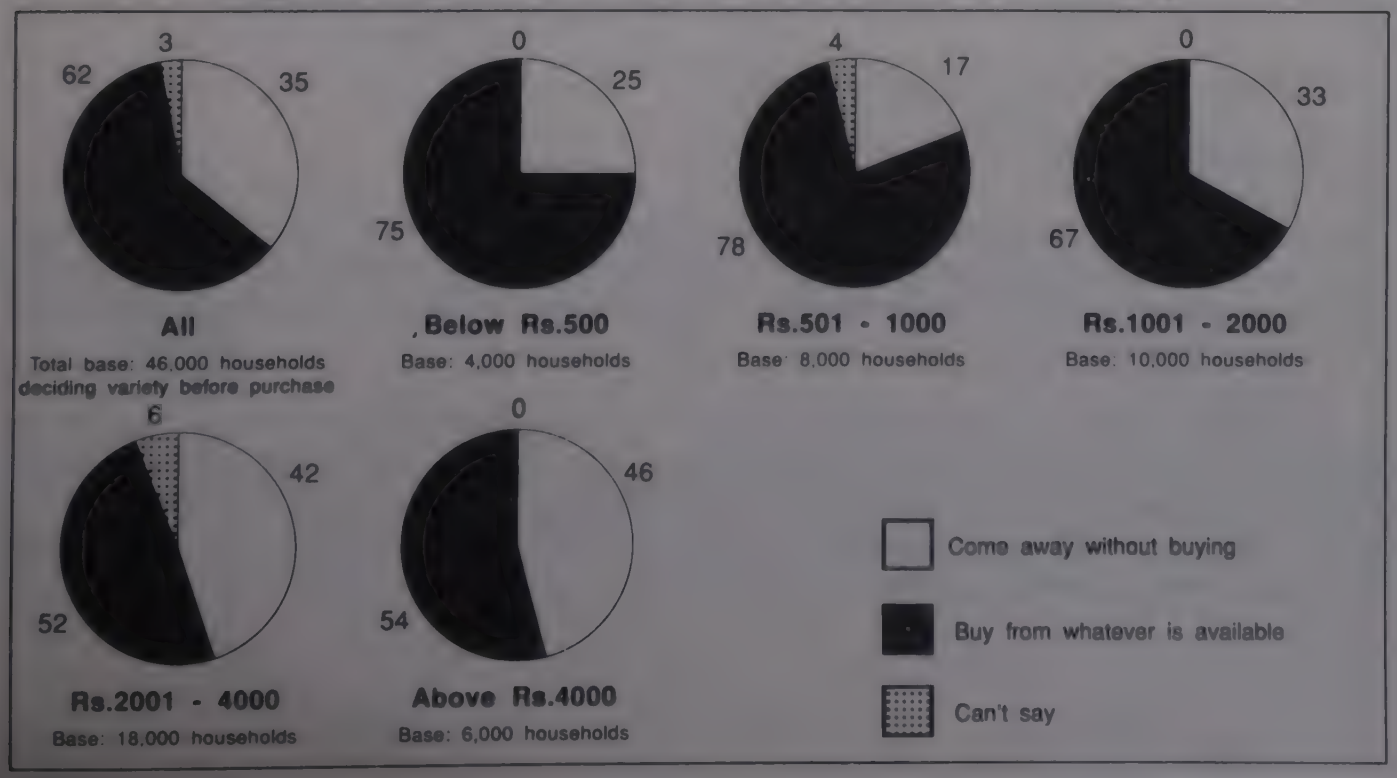
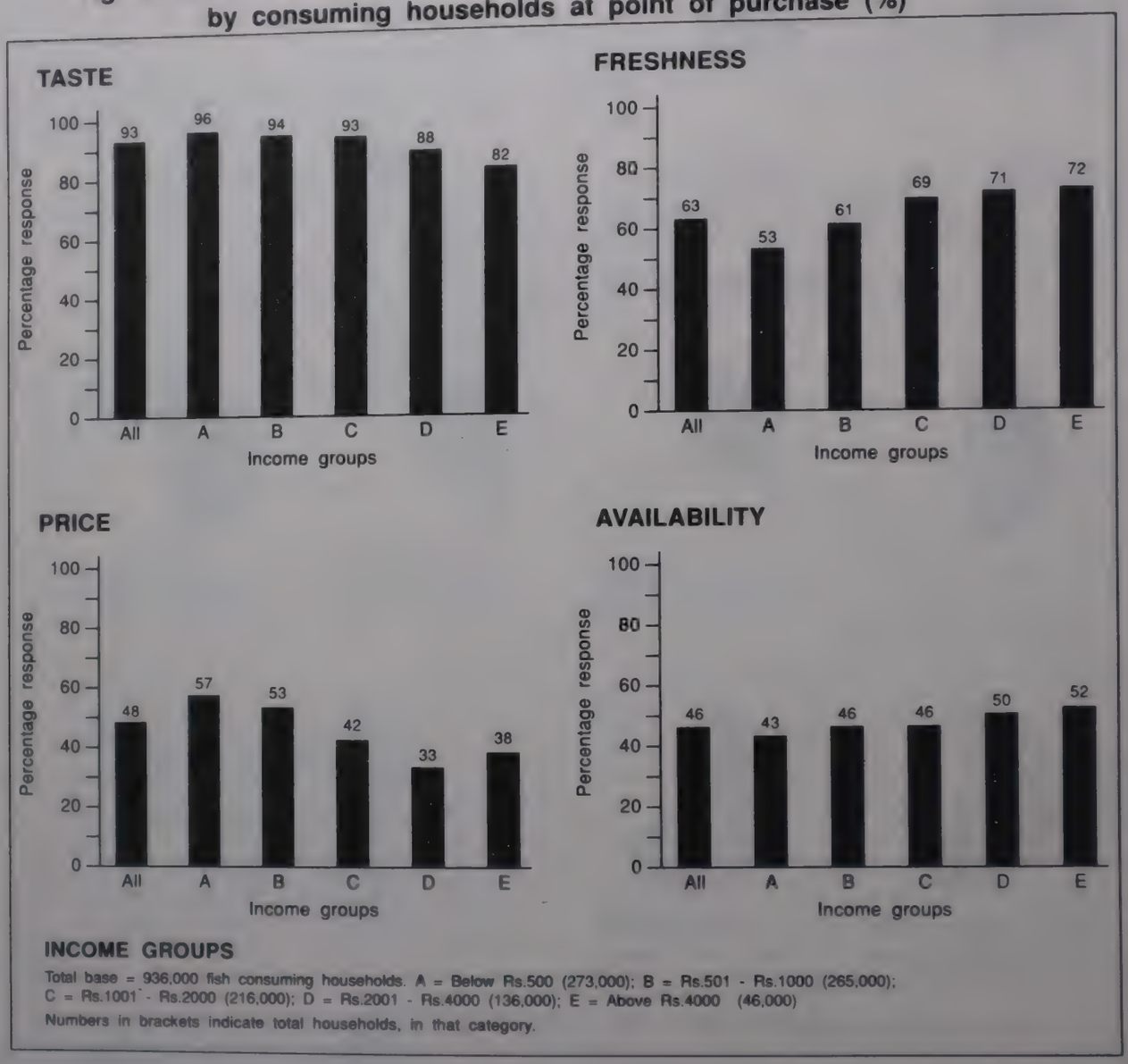


Fig 47. Response if fish decided on is not available (%)



63 per cent of the respondents mentioning it. Price has a major role to play only in the lower income groups. This again confirms the earlier hypothesis that people are specific about the variety of fish they eat for reasons other than economy — obviously 'taste' is the crucial factor and with the development of taste, the preference for specific varieties has probably become very pronounced. The restriction of varieties to specific income groups is, however, obviously a function of price (see Figure 48).

Fig 48. Factors influencing decision on variety of fish to be purchased by consuming households at point of purchase (%)



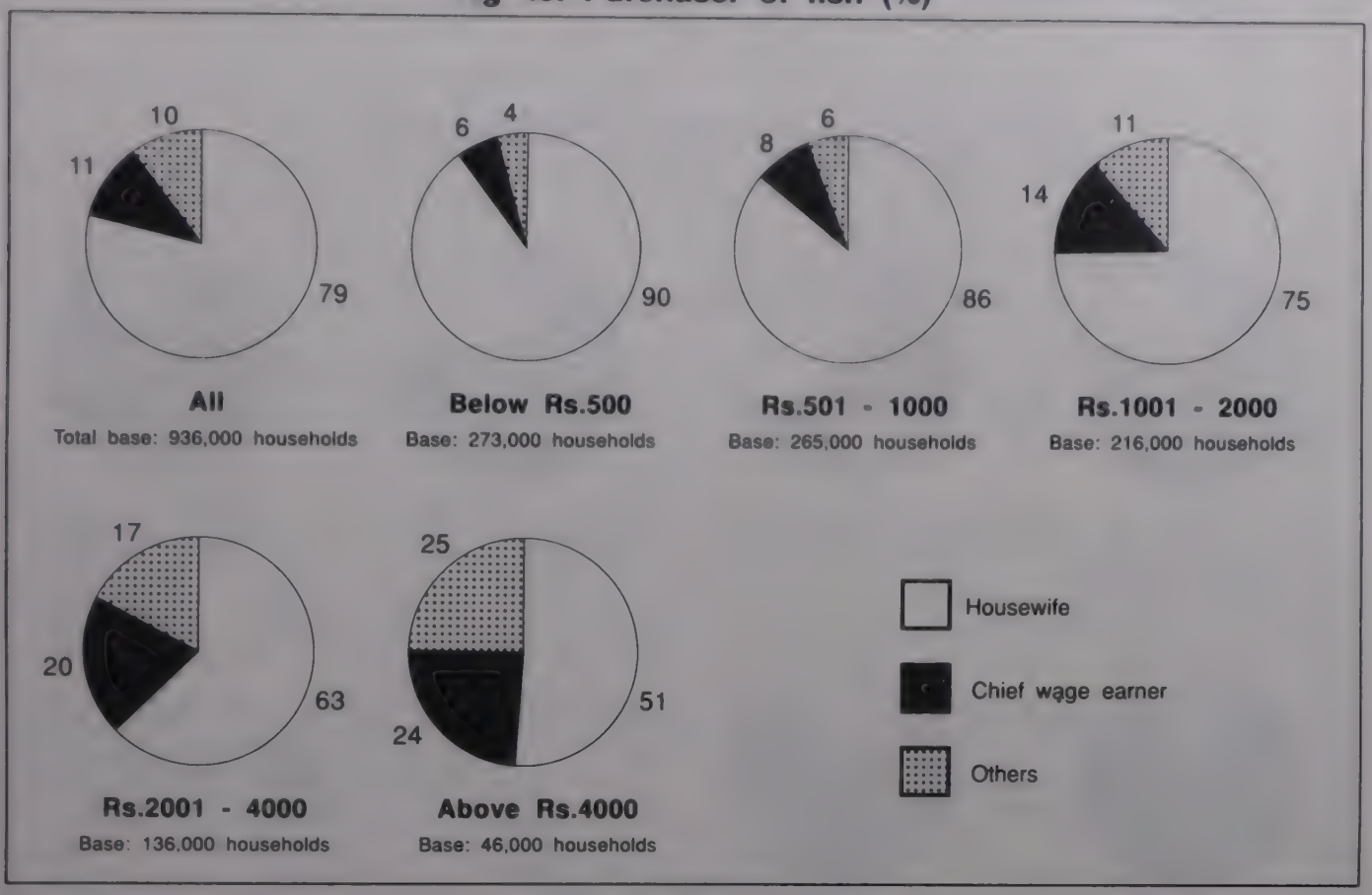
7.4 *Purchaser of fish*

The purchaser of fish, by and large, is, in most households, the housewife. However, the incidence varies a lot with income, with the housewife being the predominant purchaser in those households with an income of upto Rs 500 (90 per cent). This proportion is only 51 per cent in households with incomes over Rs 4,000.

In households with a monthly household income over Rs. 4,000, although 72 per cent of the housewives decide, only 51 per cent actually buy. This phenomenon would suggest a slight problem in access to the fish market for those in this category, either because the market is too far or the fact that the housewife is hesitant to go there. Which might indicate a real need for the fish being made available elsewhere.

In the Rs. 4,000 income group, the incidence of the chief wage earner as well as others buying is fairly high (24 and 25 per cent respectively). The latter refers to domestic help etc. and hence is probably why the varieties are pre-decided before setting out to buy the fish (see Figure 49).

Fig 49. Purchaser of fish (%)

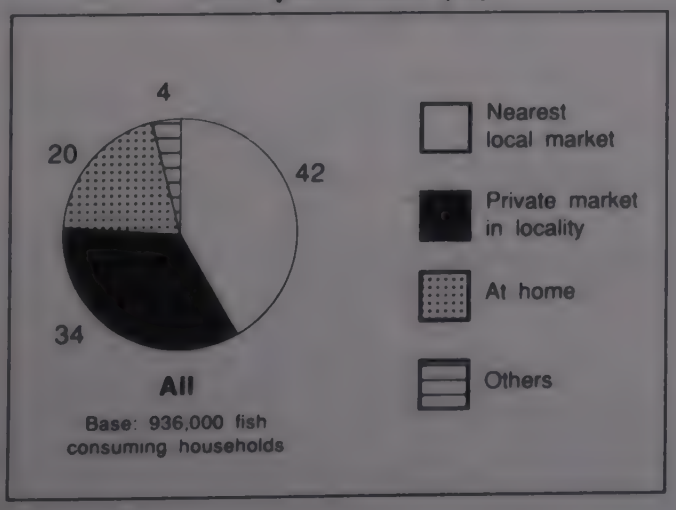


7.5 *Location of purchase point*

Most of the respondents bought fish at home or in the locality (see Figure 50). This would indicate a generally high degree of availability of the product, although not necessarily the variety sought (see Figure 51 on next page).

The incidence of buying at home is 20 per cent. This is slightly higher in the lower income group demand for fish in the lower income groups (see Figure 51 on next page).

Fig 50. Location of fish purchase (%)



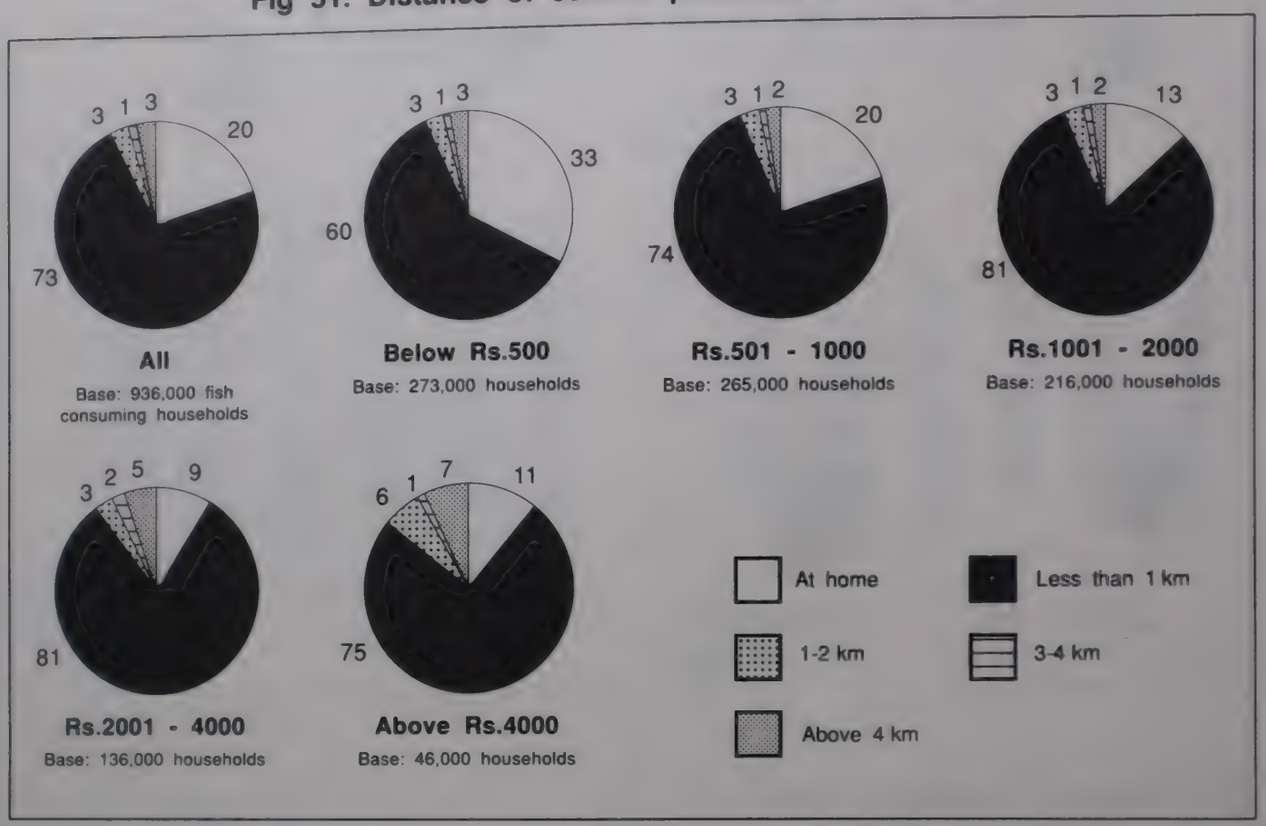
The reasons given for selecting a specific location to buy from were ranked as follows:

Access	1	(more important)
Freshness	2	
Price	3	
Variety	4	
Fair weight	5	(less important)

Three-fourths of the respondents indicated that they bought their fish in the nearest local market which is, by and large, within 1 km.

A very small proportion of people indicated having to go more than 2 km to buy fish (4 per cent in the lowest income group and 8 per cent in the Rs 4,000+group). These probably are the people who are particular about their choice and go to 'special' places/markets to buy fish/fish products (see Figure 51).

Fig 51. Distance of current purchase location (%)



8. NON-VEGETARIAN HOUSEHOLDS NOT CONSUMING FISH

Housewives in non-vegetarian households not consuming fish were first asked for specific reasons for non-consumption.

They were further asked about the consumption of fish outside the home by the family/individual members of the family.

Individuals were also listed in descending order of age, and one individual then randomly selected using the random selection grid. It was determined from this individual whether or not he/she consumed fish outside the house. Specific details, regarding frequency and place of consumption, were obtained where consumption was indicated.

8.1 *Reasons for not consuming fish in non-vegetarian households*

'Smell' and the fact that 'family members did not like it' are mentioned as the major reasons for non-consumption.

Only in the Rs 2001 - Rs 4000 income groups is 'inability to clean' a major reason for non-consumption, with 25 per cent of the respondents giving this reason. This may be because, in this category, they may personally be averse to cleaning fish and, at the same time, may not have domestic help to do so (see Figure 52 on facing page).

8.2 *Frequency of family consuming fish outside the house*

Sixtyfour per cent of the housewives questioned indicated that they ate outside the house at least once a month.

Of those eating outside at least once a month, only three per cent indicated that the family consumed fish when they ate outside.

9. VEGETARIAN HOUSEHOLDS

Housewives in vegetarian households were asked about the incidence of consumption of fish by the family and by individual members of the family outside the house.

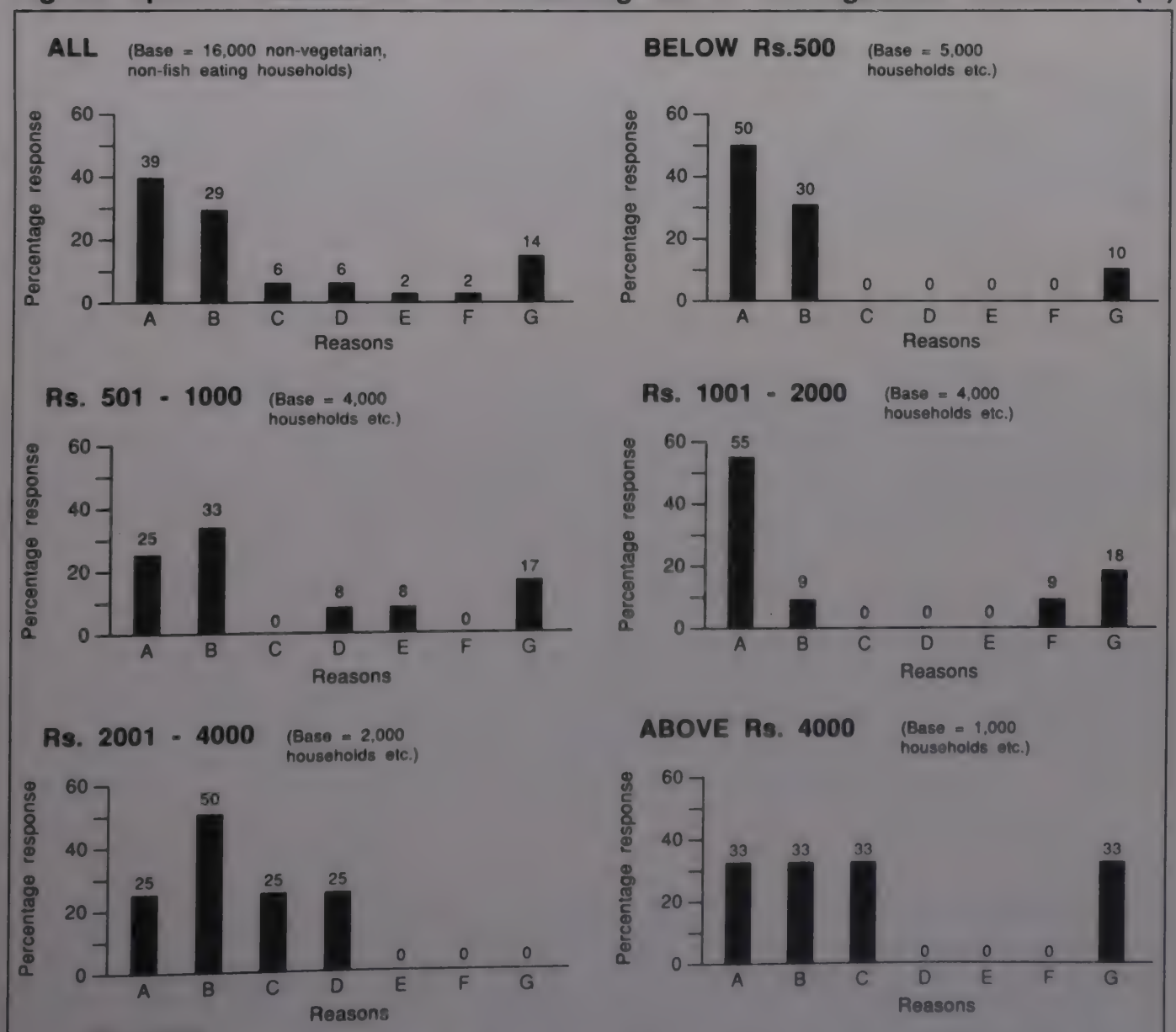
Nine out of ten housewives indicated non-consumption of fish outside the house. This promotion is much less in Muslim households, where 41 per cent of the housewives indicated consumption outside the house.

Seventyeight per cent of the families indicated that they ate outside at least once a month. Of these, 25 per cent indicated that they consumed fish/fish products when they ate outside and another 17 per cent that they ate fish only sometimes.

The individual consumers of fish as indicated by the housewife included both men and women.

The check with randomly selected individuals in the households indicated consumption amongst 8 per cent of the individuals — mostly men (76 per cent) and working persons (63 per cent).

Fig 52. Specific reasons for not consuming fish in non-vegetarian households (%)


ALL (Base = 16,000 non-vegetarian, non-fish eating households)
BELOW Rs.500 (Base = 5,000 households etc.)
Rs. 501 - 1000 (Base = 4,000 households etc.)
Rs. 1001 - 2000 (Base = 4,000 households etc.)
Rs. 2001 - 4000 (Base = 2,000 households etc.)
ABOVE Rs. 4000 (Base = 1,000 households etc.)
Percentage response
Reasons
A B C D E F G
39 29 6 6 2 2 14
50 30 0 0 0 0 10
25 33 0 8 8 0 17
55 9 0 0 0 9 18
25 50 25 25 0 0 0
33 33 33 0 0 0 33

REASONS

A = Smell; B = Nobody in the house likes it; C = Market is too far; D = Don't know how to clean fish; E = Don't know how to cook fish; F = Don't like the bones; G = No specific reasons

Buying fish at a Madras market

PART B

FISH CONSUMPTION:
FINDINGS OF QUALITATIVE RESEARCH

A qualitative study was carried out from 25.10.91 to 31.10.91, after the quantitative research was completed (see Part A). The latter, of course, provided most of the guidelines for its execution. In particular, attitudinal aspects of consumer response, impossible to derive clearly from the questionnaire, were probed. Moreover, an attempt was made to identify areas of real dissatisfaction, current needs and scope for improvement through intervention by either public or private sector agencies.

10. ATTITUDES TO FISH

A major objective of this research was to discover consumers' attitudes to the consumption of fish. However, it would be pertinent to examine first the critical needs and concerns in the area of foods in general, then to those pertaining to vegetarian and non-vegetarian foods, and, finally, to the specific perceptions relating to fish. Such an overview would help in understanding the reasons for a high level of involvement with certain foods and the inhibitions related to other foods.

10.1 *Classification of foods by needs and expectations*

In order to understand the basis on which consumers classify various foods, consumers were asked to list all the foods that they consume and these were to be grouped according to dimensions they considered critical. The outcome of such an exercise revealed that taste, nutrition and the occasion or frequency of consumption are the critical dimensions. In other words, consumers perceive that foods could have different properties in relation to taste, nutrition or occasion.

10.1.1 TASTE vs NUTRITION

Consumers across all income groups unanimously agree that **taste** is the major consideration in planning a menu or a meal — be it for every day consumption or a special occasion. While the need to fulfil nutrition requirements, especially of the children and men, is considered important, consumers are nevertheless of the unanimous view that even though a food may be nutritive, if it fails in terms of taste, there is little purpose in buying or preparing it. Housewives choosing nutritive food say care is taken to prepare it in a tasty manner.

10.1.2 HEALTH CONCERNS

There appears to be an increasing concern for **health** among consumers, not only among the educated elite, but also among the lower income, illiterate consumers. While all consumers are aware of the unhealthy qualities of certain foods, middle and upper income consumers are also aware of the specific reasons why certain foods are considered unhealthy. The most common concern is related to the consumption of fatty foods, which are associated with an increasing incidence of high blood pressure, cholesterol and heart diseases.

Some consumers have graduated to a level where, in addition to ensuring taste and nutrition, an attempt is also being made to plan a wholesome and balanced diet. In other words, vegetables are included for their perceived vitamin content, wheat or rice for their carbohydrates, non-vegetarian food to stimulate growth, milk and eggs for calcium, pulses for proteins and so on.

10.1.3 ECONOMY

Among lower and middle income consumers, the need for **economy** is far more pronounced. The unit price, as well as the shareability of food, are critical for these consumers. The staple food, rice, is viewed as a stomach filler and the side dishes — curry or *sambar* (gravy) — are primarily meant to enable the person to consume a lot of rice. In other words, side dishes are merely taste additives. At the same time, it would be wrong to assume that these low income consumers are unaware of the need for nutrition or the nutritive value of certain foods. Affordability is the prime reason for their existing practices.

Even among low income consumers, there are two segments. One segment comprises of those who give economy and unaffordability as the reasons for eating the food they do and are resigned to consuming food which is not very nutritive. There is another segment which holds that, despite their poor economic status, their nutritive needs are met. The argument of these consumers is that nutritive food is not necessarily expensive. Some of the examples cited are spinach, leaves of the drumstick tree (which is grown in most neighbourhoods), the pith of the plantain tree, the flowerettes of the plantain tree, eggs etc. They also believe that if only a person is willing to spend time looking for alternatives, there are many less expensive ones available. To upper income consumers, however, these options are not only uninteresting and difficult to emulate, but also not very status enhancing.

10.2 *Perceptions relating to vegetarian food*

Consumers' perceptions of vegetarian food are, to a large extent, positive. They generally consider 'vegetarian' to be all that is **not** 'non-vegetarian'. But in the context of comparing non-vegetarian and vegetarian food during the survey, only those foods which could substitute non-vegetarian foods were taken into account, *viz.* vegetables, curd and, among the lower income groups, pulses.

It was found that the lower the income, the greater the substitution of fish for vegetables, curd, pulses etc. Among the middle and upper income groups, on the other hand, there is a felt need to include some such 'vegetarian' foods, even when fish or mutton is cooked. But a view largely expressed is that "when non-vegetarian is made, no one touches vegetables or *dal* or curd".

The positive and negative aspects of vegetarian food in the eyes of the consumers were:

Positive perceptions	**Negative perceptions**
* Essential ... Critical component of a balanced diet	* Does not fulfil nutrition needs completely
* **Healthy to consume**	* **Taste not gratifying (to adults)**
* Cheaper than non-vegetarian	* Vegetarian cooking more elaborate
* **Relatively easy to digest**	* **Lacks status**

10.3 *Perceptions relating to non-vegetarian food*

In addition to fish, three other non-vegetarian foods were assessed in this research, *viz.* mutton, chicken and eggs. (**Note**: beef is not commonly consumed due to religious sentiments and pork is avoided following negative propaganda and also religious sentiments.)

The positive and negative assets associated with each are:

MUTTON

Positive perceptions	**Negative perceptions**
* Tasty	* Expensive (especially for lower and middle income consumers) USER IMAGERY : Businessman, Wealthy.
* Nutritive	* High fat content (of particular concern to upper income, heavy consumers) USER IMAGERY : "increases cholesterol level in blood"; "undesirable for diabetics".
* Easy to prepare	* Not easily digestible
* Status-enhancing	* Cooking time is longer

CHICKEN

Postive perceptions

Across groups perceived to be:

* Tasty
* Easy to prepare
* More affordable than mutton
* Status-giving

Among middle and upper income groups:

* *"Less fat content"*
* *"Next best to fish"*
* *"Good for B.P., heart diseases and diabetes"*
* *"Ideal for entertaining guests"*
* *"Has an intrinsic taste"*

Negative perceptions

Low income groups perceive it as:

* Expensive
* Outlay felt to be more

Upper income groups feel it is:

* Not easily digestible
* Heat-producing

Other perceptions:

* *"Has to be avoided in summer"* (upper income)
* *"Cannot be kept for the next day"* (lower and middle income)
* *"Could be poisonous if not cleaned properly"* (upper income)
* *"Requires a lot of oil to fry"* (middle income)

EGGS

Positive perceptions

* Liked by children across groups
* Health benefits

  "Simplest way of making available nutrition" (lower income)

  "Can even be given to the sick" (low income)

  "A must for growing children — advertisements say so" (middle income)

  "Rich in proteins, vitamins, calcium" (upper income)

* Convenient

  "Easiest to cook"

  "Can be prepared in many ways"

Negative perceptions

* No negatives associated across groups
* Can only serve as a side dish

  "No mess, no smell"

  "Affordable"

10.4 *Perceptions relating to fish*

Some of the responses of consumers, across all income groups, are quoted below to highlight their perceptions of fish as a food item.

Low-income consumers:

"Fish is good for health - has calcium, purifies blood"
"Small fish are nutritious"
"Shark is good for lactating mothers"
"Medicines are made from fish oil"
"Good for the eyes - especially Sardine"
"Indian salmon is good for B.P."
"Crab is advised for colds"

Middle-Income consumers:

"Fish has high oil content"
"Can prevent, cure many diseases"
"Crab ..... for colds, eosinophil primary complex"
"Good for colds, lactating mothers"
"Rich in vitamin-A, calcium, protein"

Upper-income consumers

"Small fish is tasty ..... also good for health ..... doctors advise us to eat small ones"
"Has Vitamin-A"
"Can substitute carrots, greens"
"Contributes to good eyesight, long hair ...and brains"
"Fish can even help reduce weight"
"Has a taste of its own"
"Rich in protein, calcium"

10.5 *Motivations to consume fish*

Consumers were asked about the factors that motivate consumption of fish. The findings, as the consumer perceptions in the earlier section reveal, are similar to the quantitative study.

Among **lower income groups**, the main motivators for consuming fish are:

* Taste
* Economy
  (Economy benefit is associated, as it serves as the main and side dish and does not require expensive ingredients).
* Affordability

Among **middle** and **upper income groups**, in addition to the above, the following motivating factors were stated:

* Do-good benefits
* Ease of preparation (short cooking time)
* Easy digestibility
* Safe (non-fatty) to consume

10.6 *Barriers to consuming fish*

Among **lower income groups** there are practically no barriers, except for such minor objections:

* Resistance by children due to smell or bones
* Likelihood of causing skin allergy
* Lack of status benefits
* Heat producing tendency
* Time consuming cleaning process

Among **middle** and **upper income groups**, major inhibiting factors are:

* Bones in the case of small and inexpensive fish
* Cleaning process time-consuming
* Health hazards
* Heat producing
* Smell while cleaning (disliked by consumer as well as by neighbours)
* Poor hygiene standards in fish markets
* Certain types can cause diarrhoea

10.7 *Comparative rating of non-vegetarian foods*

An attempt was made to get a comparative evaluation of all non-vegetarian foods in terms of dimensions that consumers perceived as critical:

	Dimensions	*Fish*	*Eggs*	*Mutton*	*Chicken*
**	Tasty	++++	++	+++	+++
**	Economical/ Affordable	++++	+++	—	+
**	High nutritive content	+++	++	+++	+
**	Status-enhancing	—	+	++++	+++
	Easy to digest	+++	+++	+	+
	Easy to clean	+	++++	++++	++++
	Cooks faster	++++	+++	+	++
	Has an intrinsic taste	++++	+	++	+++
	Healthy food	+++	++	+	++
	Can be given to infants/children	+++	++++	—	+
	Non-fatty, low on cholesterol	+++	++++	—	++
	Easily accessible	+++	++++	+++	+++
	Rich in vitamins	++	+	+—	+—
	Rich in proteins	+++	+	+—	+—
	Rich in minerals	+—	+—	+—	+—
	High calcium content	+—	++	+—	+—
	High iron content	++	—	+—	+—
	No wastage involved	—	++++	++++	++
	Stimulates growth	++	++	++++	++

** Most critical dimensions; ++++ Very good; +++ Good; ++ Somewhat good; + Fair; — Poor; +— Ambivalent

11. PERCEPTIONS RELATING TO VARIOUS TYPES OF FISH

The quantitative component of this research clearly indicates that consumers in Madras are aware of a number of varieties of fish. During the second part of the research, an attempt was made to understand consumers' awareness of the taste, physical characteristics, nutritive value, price and availability of the various types of fish available. It became clear that consumers are aware of as many varieties as indicated by the quantitative research and sometimes even more. Housewives could effortlessly verbalize the motivations and deterrents for the purchase and consumption of the various types. The research also indicates that lower income consumers are not only aware of many more varieties but also have knowledge about the characteristics of each. In addition to seafish, some housewives, those originally from non-coastal districts, are also aware of freshwater fish.

11.1 *Awareness of types*

Since the extent of awareness varies not only across income groups but also within each group, an income-wise analysis as well as the degree of awareness are presented in the following table:

AWARENESS OF TYPES

Species	*Monthly household income*				
	<Rs.500	*Rs.501-Rs.1000*	*Rs.1001-Rs.2000*	*Rs.2001-Rs.4000*	*Above Rs.4000*
Seer	H	H	H	H	H
Bream	H	H	H	H	H
Anchovy	H	H	H	H	H
Shark	H	H	H	H	H
Pomfret	H	H	H	H	H
Whitefish	M	M	M	M	L
Mackerel	M	L	NA	NA	NA
Seaperch	H	H	H	H	H
Goatfish	H	H	H	H	H
Sardine	H	H	H	H	H
Ribbonfish	H	H	H	H	H
Lizardfish (Saurida sp)	M	M	M	M	L
Catfish	H	H	H	H	H
Silverbelly	H	H	H	H	H
Horse mackerel (Carangids)	M	M	M	L	NA
Indian salmon (Polynemids)	L	L	L	L	NA
Sole/Flatfish	M	L	M	L	M
Ray	A	L	M	L	M
Eel	H	NA	H	H	H
Tuna	L	M	L	M	M
Barracuda	M	L	H	M	L

H = High awareness; M = Medium awareness; L = Low awareness; NA = No awareness

11.2 *Perceptions relating to types of fish*

The group discussions revealed that at least a few consumers in every group claimed to have knowledge about each type. Further, barring a few, men, as a category, appeared to have little knowledge about the appearance, taste and nutritive value of fish. At best, men were able to authoritatively discuss a few popular varieties. A discussion of purchase habits revealed that even when men were involved in the purchase, it was not on a regular basis. Further, men 'played it safe' by confining their purchase to a select few types of fish. This explains why there is little opportunity for men to have a good knowledge.

Among housewives, too, there were some who admitted ignorance, which was partly because of their relatively low involvement with fish or because they had older women in the house to help them in buying, cleaning and even preparing the fish.

The tables that follow highlight consumer perceptions relating to each type of fish.

PERCEPTIONS RELATING TO TYPES OF FISH

Types	*Perceptions relating to*			*Involvement and consumption*	*Preparation*
	Product	*Price*	*Availability*		
Seer	Tastiest Has one bone Fleshy Does not smell Easy to clean and cook Nutritious	Expensive Not affordable by all	Easily available Status-enhancing Occasional, by low and middle income groups	Liked by children	Curry Fry
Bream	Tasty Fleshy Not many bones Easy to prepare Good value	Cheap, affordable	Easily available	High across groups Regular consumption	Curry Fry
Anchovy	Aware of white Anchovy only Tasty Few bones Big and small	Cheap	Available	Moderate involvement	Curry
Shark	Tasty Few bones *("eating is a pleasure")* Has closed gills	Costly	Available in plenty	Muslims do not consume this Lactating mothers consume this Good for stiff joints High involvement	Curry *Puttu* Cutlets

(continued overleaf)

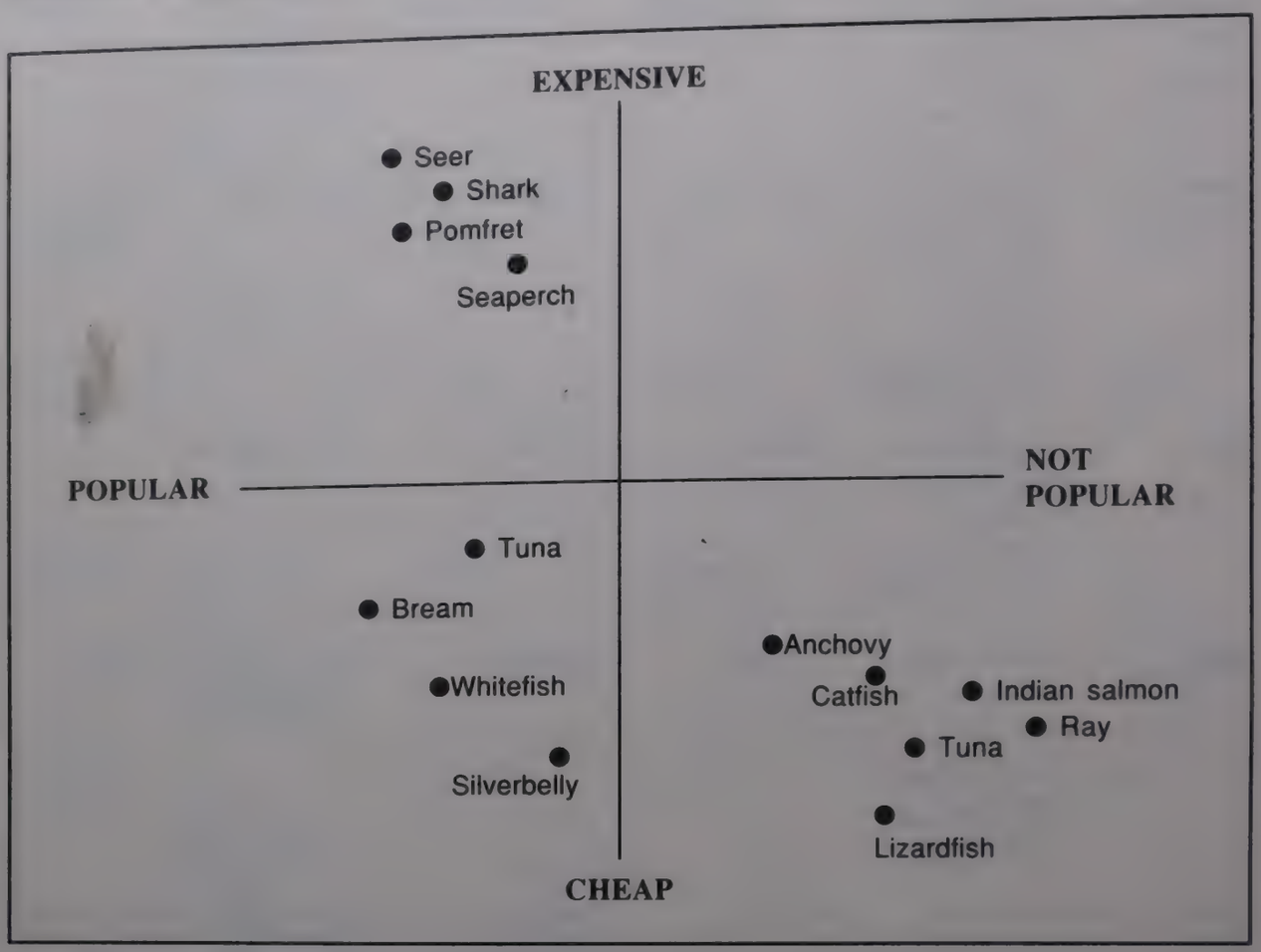
Types	*Perceptions relating to*			*Involvement and consumption*	*Preparation*
	Product	*Price*	*Availability*		
Pomfret	Tasty No wastage Few bones Easy to clean Does not smell	Expensive	Available	Preferred Occasional consumption	Curry Fry
Whitefish	Tasty Easy to clean Few bones	Cheap	Easily available	High among low income groups	Curry
Mackerel	Tasty	Cheap	Available	Bought only by low income consumers	Curry Fry
Seaperch	Few bones Tasty Fleshy Difficult to clean	Costly	Available in plenty	-	Good for frying Also for curry
Goatfish	Tasty Red colour Looks like Bream Not many bones	Moderate	Available	High Consumed by all	Curry
Lizardfish (Saurida sp)	Round shape Lots of bones Small fish	Cheap	Easily available	Not a favourite	Curry
Catfish	Quite tasty Lots of bones Smells a little Has feelers	Cheap	Not common	Not high *"Affects the stomach"*	
Silver-belly	Small fish Tasty Lots of bones	Not costly	Available	Liked by consumers —for colds —post-delivery	Good for curry
Horse mackerel (Carangids)	Few bones Tasty	Costly 10 Rs/fish	Available in plenty	A preferred variety	Curry

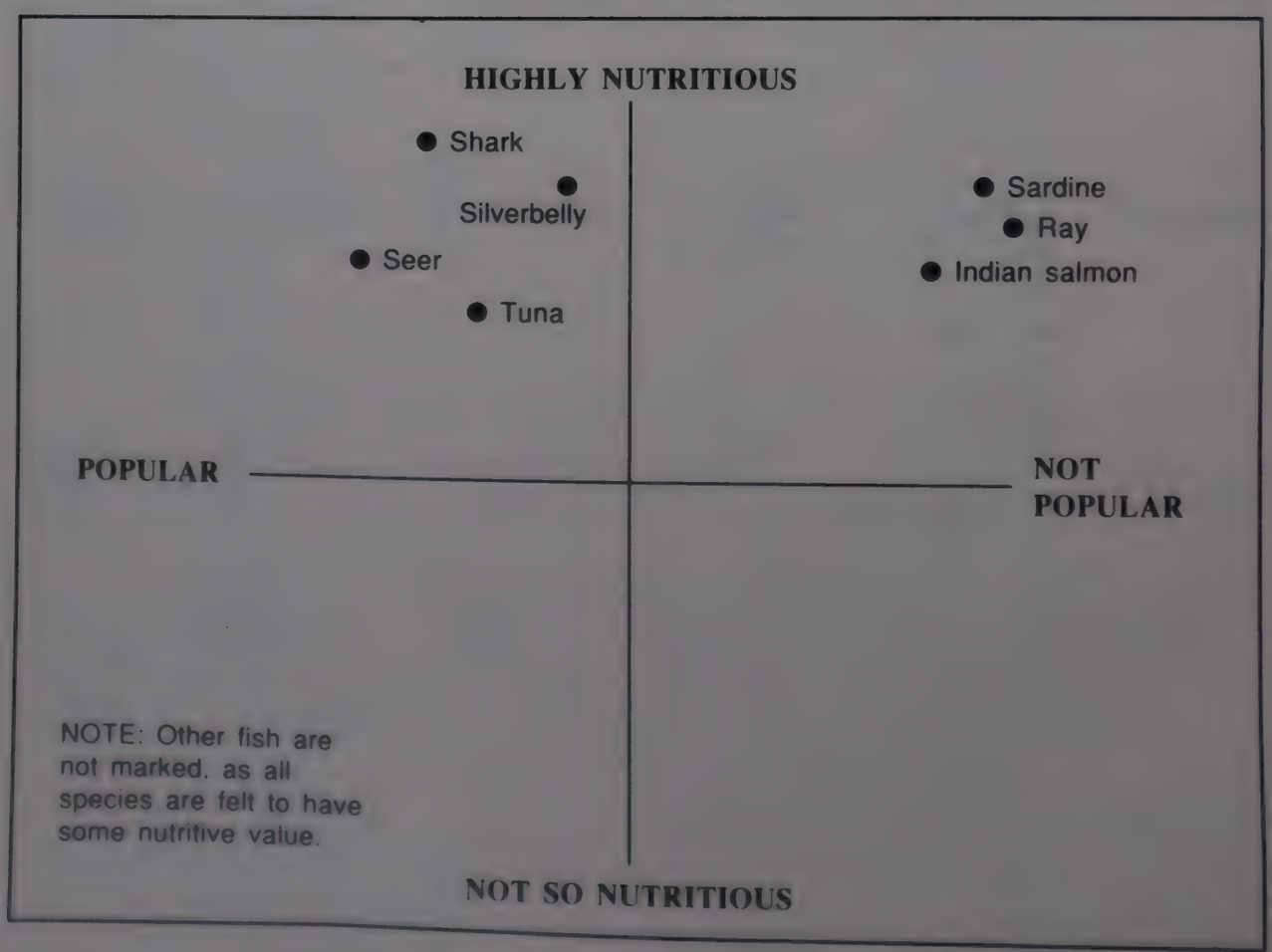
(continued on facing page)

Types	*Perceptions relating to*			*Involvement and consumption*	*Preparation*
	Product	*Price*	*Availability*		
Indian salmon (Polynemids)	Tasty Good for health, esp. colds Few bones	Costly — 15 Rs./pair	Available	Not high -	
Sole/ Flatfish	Two kinds: heavier one is tasty No bones Flat, pink fleshy, slippery	Reasonable	Available	Not high	Good for frying
Ray	Lots of bones Round, like a shark Strong odour Good for health	Cheap	Available	Not popular	-
Eel	Appears like a snake Bad odour Freshwater High fat content	Cheap	Available	Very low Not popular	Curry
Tuna	Not tasty Bad odour Looks like Seer Flesh is red Hard like meat Passed as Seer	Cheap	Easily available	Not popular -	
Barracuda	Freshwater fish Tasty Long, sharp ends Difficult to clean Few bones	Cheap 3 Rs./heap	Available	Not high	Suitable for curry

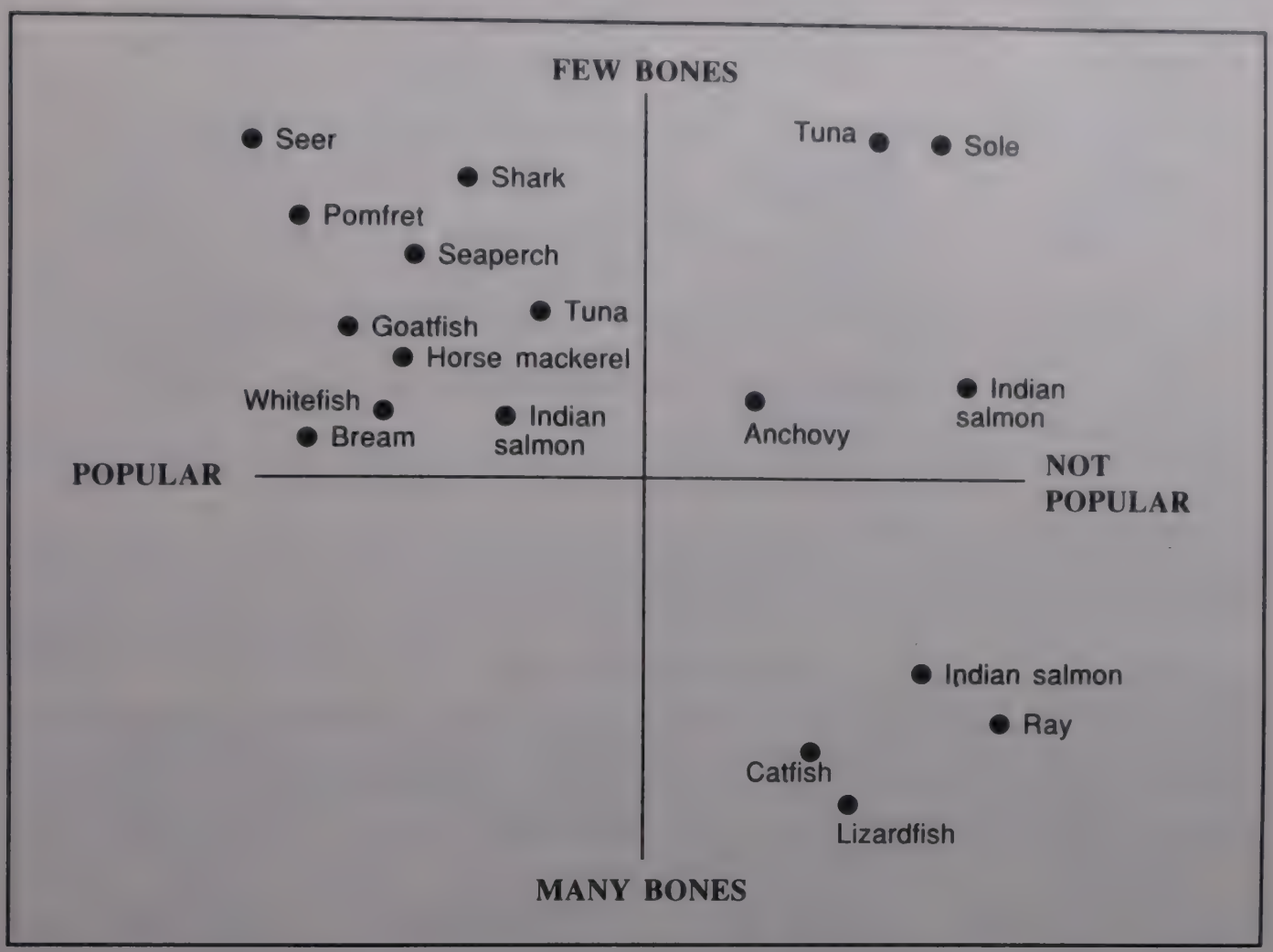
11.3 *Perceptual charts of fish*

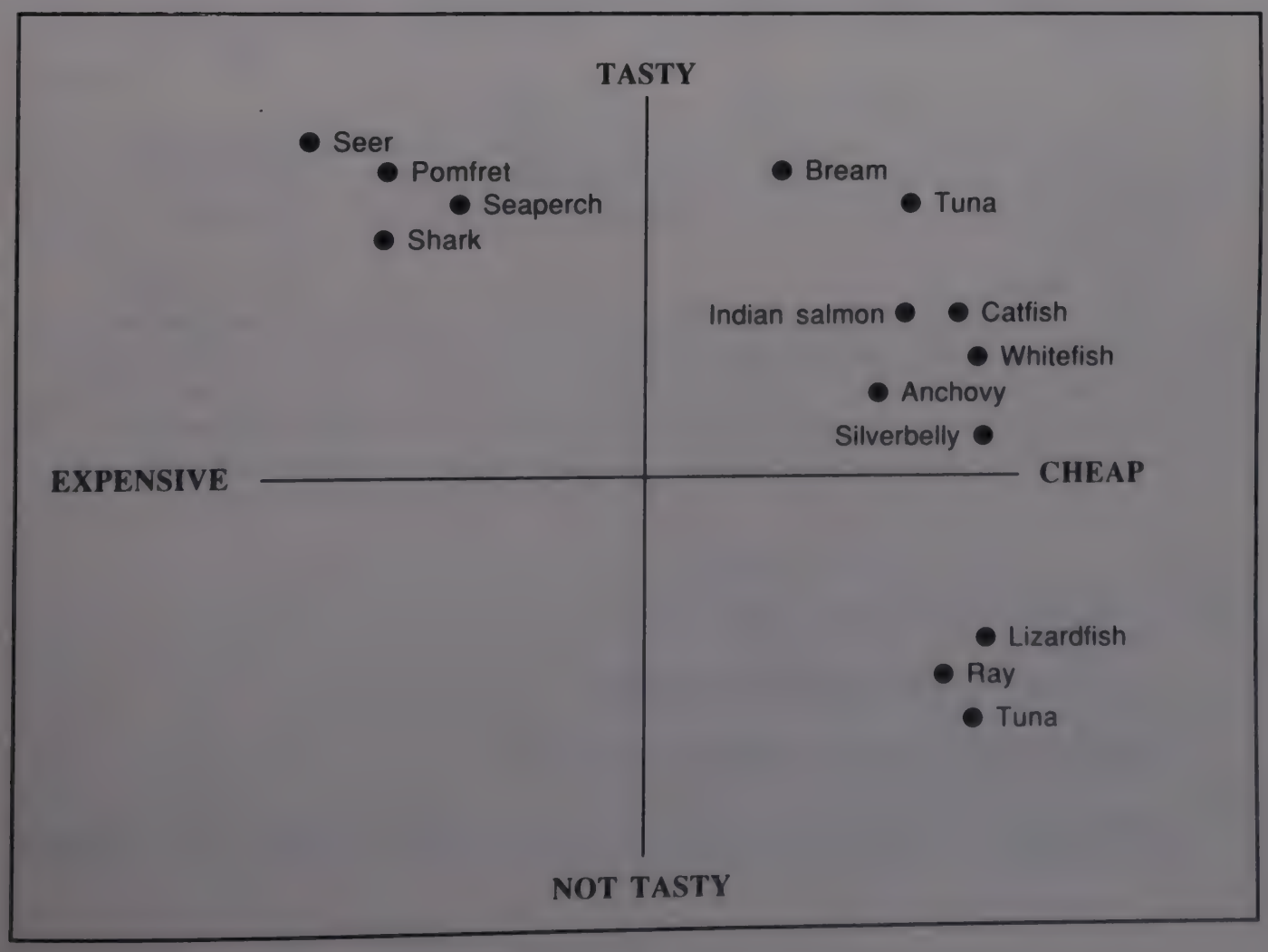
An attempt was also made to elicit consumers' perceptions relating to the relative strengths and weaknesses of the types of fish they were aware of. A few critical dimensions were selected and consumers were asked to rate the fish according to these dimensions. The results of such an





exercise are plotted on the perceptual charts which follow. It would be pertinent to mention here that the points are decided upon on the basis of consumer perceptions rather than on any quantitative data.





11.4 *Perceptions relating to Crab*

Perceptions	*Benefits*	*Barriers to usage*	*Usage practice*
Small and big sizes and sea and pond varieties felt to be available; sea type felt to be tastier	Rich in vitamins	Some consumers unaware of cleaning process, cooking process (lots of wastage)	Bought both live or dead
Price proportionate to size	Good for colds, asthma eosinophil, primary complex, wheezing	Takes time to to eat; need to use both hands	Fry, sweet dish, *puttu*, *korma*, soup.
Best during new moon phase — when heavy (more fleshy) Crab felt to be available	*"Supposed to stimulate brain cells"*	Heat-producing	
	Tasty		

11.5 *Perceptions relating to dried fish* (Karuvadu)

Perceptions	*Benefits*	*Barriers to usage*	*Usage practice*
Across income groups, felt to be tasty	Useful in emergencies, rainy season, when fish is not available	Strong odour	Low, middle and upper income consumers stock dried fish
Involvement and consumption high in low income groups	Tasty	Too much salt — can cause B.P. — can cause diarrhoea — skin allergy	Fried at least twice a week
Good quality is defined as that which is free from sand, less salty, stiff, properly dried, white in colour.	Can be stored	Good quality not easily available	Used in place of chips or pickles
			Best varieties Seer, Seaperch (Cock-up), Anchovy, Ribbonfish are felt to be tasty and smelly.

11.6 *Perceptions relating to Prawn*

* Small and medium-sized Prawn perceived to be more easily available.
* Across groups, Prawn are felt to be costly, unaffordable.
* While small Prawn are seen as relatively cheap, they are considered difficult to clean.

* Prawn are perceived to be very tasty and are liked by all, but are considered uneconomical.

  "Prawn are uneconomical — not only costly, but reduce to half the size when cleaned"

  "We need to add drumsticks, potatoes..... for mileage."

  "Making Prawn dishes is a thankless job... even children like it a lot .....nothing will be left over for us." — (Housewives)

* Prawn specialities: Fry, *biryani*, *korma*, *vada*, *bajji*, cutlets

* Low income consumers buy small variety when they are cheap.

* Middle and upper income consumers buy Prawn at least once a month.

11.7 *Awareness and perceptions of packaged/processed fish*

Lower income consumers are completely unaware of packaged or processed fish foods. Since affordability and economy are critical to these consumers, they do not express a need for packaged or processed fish. However, they are heavy users of dried fish, finding it handy and economical. They also do not mind its smell.

Good quality dried fish is not felt to be easily available. The currently available dried fish, at least in the markets that these consumers frequent, is felt to be improperly dried and contains too much salt, which, it is felt, causes diarrhoea and other health problems. What these consumers desire is a properly dried fish, with less salt, free from sand and dust, and available loose rather than packaged. They are quite clear that they do not wish to pay any premium for packaging.

While a few middle and upper income consumers feel that good quality dried fish is available in certain markets — both loose and packaged — most are not aware of this. There is a need among these consumers for clean, good quality dried fish, preferably without salt. They are quite willing to pay a premium of two to four rupees for such quality as well as for a functional kind of packaging.

The quantitative study indicated a fairly high degree of awareness of frozen fish. So consumers in the groups were further asked what they understood by the term 'frozen fish'. Except upper income consumers, there was no clear understanding of the term and it appeared to be generally used for all iced fish.

Middle and upper income consumers are aware of a number of packaged fish items *viz.* packaged or tinned Prawn, tinned fish, especially of Seer and Seaperch, Prawn chips, pickles, fish pickles, dried Prawn, fish in vinegar and Prawn appalams. However, there is very little trial of any of these products. The fears or doubts are related to shelf life, smell and taste of such products. Since there are few companies of repute manufacturing or marketing such products, the general run are perceived to be not reliable or of good quality.

Among those groups which showed an interest in packaged fish or fish products, a few packaging ideas were examined. Fish fillets in transparent polythene bags and cartons were shown to them. Upper income consumers displayed greater interest in transparent polypacks than in cartons. The former, it is felt, enables the consumer to examine the freshness and quality of the fish as well as of the quantity available. Further, polypacks are felt to be better value packaging compared to cartons. When asked about the ideal pack sizes, consumers felt that options of 250 g and 500 g packs would be useful. The majority prefer smaller packs, since these induced trial and experimentation. When asked whether they prefer fish in raw or processed form, the consumers stated that processing not only hiked the cost of the product but also restricted the nature of preparation.

The latter objection could be explained by the research experience available in the area of foods. The reason why ready to cook, or ready to bake, foods are yet to become popular in India is that whenever the role of the housewife in preparing food is unduly reduced, it is not only seen as robbing her of the satisfaction of preparing the meal herself and the kudos she gets for it, but is also seen as poor value. The latter could be explained by the fact that whenever housewives compare the cost of making food themselves and buying a readymade product, their time is never considered an important input and a cost is never placed on it. One basic dimension which is critical in evaluating processed or packaged food is the value for money that it is perceived to offer.

Consumers in all the groups observed that fish products available abroad are of two types: tinned fish marinated in sauce or vinegar and the dehydrated or preserved, processed type. A lot of consumers prefer the second type, as they feel it to be more versatile and relatively more affordable. The premium that consumers are willing to pay for such processed fish is 5-10 Rs/kg, depending on the variety of fish processed.

12. CURRENT PURCHASE AND USAGE PRACTICES

One of the objectives of the research was to examine the current purchase and usage practices in relation to fish as well as the rationale underlying such practices. Such an exercise was primarily meant to identify the areas of dissatisfaction, current needs and the scope for improvement in the distribution and marketing of fish.

12.1 *Purchase habits*

Purchase habits were found to vary with the different income groups. Lower and middle income housewives normally buy all vegetarian food items themselves. Among upper income groups, however, the task is shared between the men and women. Even in the latter case, the men are found to be involved only in certain circumstances *viz.* when the markets are far away, when the market is expected to be too crowded, when a large quantity is to be bought or a bigger market is preferred.

Another aspect of male buying of fish is that, as fish is generally available only later than 10 am, men are generally available only on Sundays to purchase fish or other non-vegetarian items. This suits households where fish or other non-vegetarian food is prepared only on Sundays. But in the case of households where fish is cooked on other days too, it is the housewife who, after completing the routine chores, goes to the market to buy fish.

Other reasons why housewives do not rely on the menfolk to buy fish are that the men are not felt to have sufficient knowledge about the various types of fish or their freshness and that the men do not bargain at the outlets.

The outlets frequented by lower income groups are the fish markets in the vicinity. Consumers belonging to the middle and upper income groups, however, are felt to utilize local markets, the more popular bigger markets, the government fish stalls or even the home vendors. Home vendors are of two types: those covering lower income areas, and who are perceived to have a downmarket image because of the supposedly poor quality (left-overs) of fish they carry, and those operating in the upmarket localities who not only bring good quality fish but also variety according to the consumers' needs. Male vendors are felt to bring a wider variety of fish on bicycles, whereas women normally carry less variety.

The frequency of purchase of fish is found to be a function of the frequency of preparing fish dishes. Consequently, fish is, on an average, bought twice a week. Lower income groups state that the frequency of purchase is a function of their disposable income, the prevailing price of fish at the time of purchase and the relative price of vegetables.

An attempt was made to find out the consumers' outlay on fish and, more specifically, whether there was a certain committment in terms of the quality of fish or outlay on fish across income groups. Group discussions revealed that among lower income groups, as little as Rs 5-6 is spent a week on fish, since a heap is available for Rs 2-3. The upper income consumers' outlay ranges from Rs 25 to Rs 30 a week, mainly because the expensive varieties are bought.

12.2 *Variety of fish consumed*

The variety of fish bought and consumed by consumers was found to be different for the different income groups covered during the research. Despite low income consumers being aware of a very wide variety, they consume only a few inexpensive varieties on a regular basis *viz.* Bream, Goatfish, Sardine, Silverbelly. These consumers occasionally bought Pomfret and Seer varieties and the smaller, cheaper varieties of Prawn.

Middle income consumers confined their regular purchase to Bream, Shark and Sardine. Pomfret, Seer varieties and Prawn (again, the smaller variety) are occasionally bought.

Upper income consumers were found to be far less prone to experiment than the middle and lower income consumers. Due to familiarity with the taste and their perceived premium, these consumers buy Seer, Pomfret and Bream. Seer and Silverbelly are bought for a change. When good quality and large-sized Prawn are available, they are also bought. These consumers are familiar with 'Golden Fish' and many have tried it.

12.3 *Factors influencing selection of fish*

Since consumers were found to make a limited selection of fish, despite awareness of a wide variety, an attempt was made to understand the factors which influence them in the selection.

Familiarity: Each group of consumers was found to restrict their consumption to familiar varieties. Familiarity is felt to be critical in assessing the taste, the number of bones, extent of flesh, oil content, the method of preparation as well as the freshness or quality of fish. The fears related to buying unfamiliar varieties are poor taste, too many bones and, possibly, poor value for money.

Freshness: While middle and upper income consumers pre-decided on the types they would buy, the specific variety that is ultimately bought is determined by the perceived freshness of the fish sold. Low income consumers never pre-decide on a type; the price is first considered and then the relatively fresher one is chosen from among the inexpensive varieties. To these consumers, affordability followed by freshness are more important than familiarity. Hence, more experimentation is found among these consumers.

Fewer bones: The ease of cleaning the fish, which is a function of the number of bones present, is another factor which influences consumers in their selection of fish. This concern is more pronounced among upper/middle income and upper income consumers. Low income consumers admit without any embarrassment that they have no choice but to select fish with more bones because of the economy benefit that it offers. They observe that the smaller varieties with more bones are tastier and more nutritive than the bigger ones. Moreover, to these consumers, time is not a limiting factor, provided it helps them save money. This also seems to apply to the rest of their consumption habits; for instance, they often buy vegetables which are cheap and nutritive but cumbersome to prepare. It is only the upper income consumers who prefer big fish due to the ease of cleaning as well as the status benefits they offer.

Consumers stated that, besides price, the premium factor, and ease of cleaning, the need for variety also governs the selection of fish. Another factor which helps consumers decide the type of fish is the nature of preparation. Certain fish are felt to be more suitable for currying, while others are selected for frying. A few middle income consumers justify the purchase of big fish by claiming that children prefer fish with few or no bones. Interestingly, certain fish are avoided primarily because of the repulsiveness caused by their appearance. The Tuna, which is perceived to have flesh akin to red meat, is one such example, while Eel, which looks like a snake, is another.

In addition to the above factors, there are specific occasions when certain types of fish are preferred due to their unique benefits. To fulfil status needs, Seer is felt to be ideal; Crab soup, Silverbelly, Whitefish are felt to be good for colds; Shark is considered a 'must' for lactating mothers as it is said to increase lactation.

12.4 *Perceptions relating to freshness of fish*

Consumers unequivocally hold that freshness is extremely important and is an overriding factor in influencing purchase. This is primarily because fish, unlike other non-vegetarian food, is seldom sold in a dressed form. Dressing, it is felt, would keep the fish fresher as it involved the removal of the organs, especially the kidney, which hasten rotting. Since chicken or mutton are sold in a dressed form, there is little fear of rotting. In the case of fish, as with consumers uncertain of the time of the catch, there is a greater fear of buying old fish. Old fish is considered poor value for money as it gives a foul smell, is difficult to slice, and spoils the preparation. It is therefore totally unacceptable.

The consumers' understanding of what is fresh fish was, surprisingly, similar across income groups. In other words, the knowledge pertaining to what is fresh is similar, irrespective of the income; however, the freshness standards adhered to are marginally different. Low income consumers admit to occasionally buying fish which is not ideally "fresh", albeit they never buy old or rotten fish.

All consumers agree that 'fresh fish' in its strictest sense is that which has not been kept on ice. However, the same consumers agree that fish is always kept on ice and 'fresh fish' (fish sold immediately after it is caught) is never available. A few consumers, however, believe that such 'fresh fish' is available on the beaches. When asked about how fresh they perceived the fish available to them was, a few felt it was available about 12 hours after it was caught, others felt 24 hours was a more realistic estimate.

12.5 *Cues used to assess freshness*

The major cues used to assess freshness were found to be similar across groups. They are:

* **The colour beneath the gills.** Deep red indicates freshness, a dull colour connotes old fish, accordingly to the consumers.

* **The firmness of the fish.** Softness means that the fish is old, a hard form indicates freshness, the consumers feel.

* **The smell.** Consumers feel that rotten fish has a telling foul smell.

* **The texture and the shine of the skin.**

* **The colour of the slices.** In the case of big fish, slicing is done after selecting the fish.

In this context, consumers observed that vendors adopted a number of tricks to misguide or fool consumers. A red dye is often applied to the gills to make the fish appear fresh. While selling in heaps, rotten fish are mixed with fresh fish. Some vendors mix sand with fish, more so with Prawn, to persuade consumers about their freshness. In the catch, it was stated, old fish was, sometimes, frozen to make it hard, so that consumers would get misled by the hardness and assume the fish to be fresh.

12.6 *Perceptions relating to outlets*

In the course of discussions, many consumers observed that one of the deterrents in going to fish markets to buy fish is the poor hygiene standards in these outlets. However, when asked to list areas of improvement, improving the hygiene at fish outlets was never mentioned spontaneously.

except by upper income consumers. Low and middle income consumers are either not particularly concerned about the poor hygiene, or a more hygienic cleaner market is perceived to be possible only at the cost of adding to the overheads and increasing the cost of the fish. Their justification for this is that even in the most hygienic market, fish would certainly smell. Moreover, the fish, whenever it is bought, is thoroughly cleaned at home and, therefore, the cleanliness or appearance of the location does not matter much. A few consumers defensively stated that their fish markets are fairly clean and that the vendors there constantly sprinkle water to drive away the flies.

However, upper income consumers strongly felt that the hygiene at outlets is critical. Many housewives felt that the entire chore of buying fish is unpleasant and disgusting and that if they had the choice they would even give up eating fish rather than visit these markets. Left to themselves, they would be quite happy eating other food and avoiding fish, they claimed, but the taste and nutrition requirements of their children and husbands had to be fulfilled, so they put up with the smell and the filth when buying fish, they explained.

While these problems are felt to be almost absent in the Government fisheries stalls, there appear to be a number of barriers to visiting them. Firstly, the stalls, it is felt, sell only big and relatively expensive varieties. Secondly, bargaining is not possible in these stalls. Since bargaining is possible in every other outlet, consumers feel they are being deprived of good value for their money. Thirdly, these stalls are not felt to be as accessible as the fish markets. However, the advantages of these fish stalls, it is felt, is the freshness of stock, good quality, correct weighing and, above all, their fairly hygienic conditions.

An attempt is made below to present in tabular form a comparative evaluation of the various outlets, based on a summary of consumer perceptions.

EVALUATION OF OUTLETS AND HOME VENDORS

	Fish markets		*Govt. fisheries*	*Home*
	Small	*Big*	*stall*	*vendors*
Availability of good quality fish	+	++	++	+—
Wide variety	+	++	+	—
Reasonable price	++	++	+	+—
Availability of smaller and cheaper varieties	++	++	—	—
Easily accessible	++	+	—	+
Bargaining possible	++	+	—	+
Good value for money	+	++	+	—

++ = Very good; + = Good; +— = Ambivalent; — = Not Good;

12.7 *Cleaning of fish*

Cleaning of fish is perceived to involve the following steps:

— removing scales;
— removing intestines;
— removing the head and tail;
— removing bones;
— washing; and
— removing oil-content in certain fish.

Consumers were found to follow certain practices in order to contain the smell:

— Low and middle income consumers smear salt and turmeric powder after cleaning the fish and marinate it for half an hour.

— Upper income consumers marinate the fish in vinegar or curd before frying it or making a curry.

In case of storing fish in the refrigerator, cleaned fish is soaked in *masala* and kept inside the freezer. Even in households owning a fridge, storing fish for over two days is uncommon.

Cleaning is done at home by housewives in the low and middle income households, as it is not perceived to be cumbersome. The time taken to clean fish is about half an hour to an hour, depending on the size of the fish.

In upper income households, small fish are cleaned in the market, bigger fish at home by the housewife or servant or the older women members of the family.

12.8 *Preparation of fish dishes*

Basic fish preparations were found to be similar across income groups. Taste is the overriding factor across groups in the preparation of fish dishes. Since fish is felt to intrinsically have a high nutritive value, consumers do not feel the need to enhance or retain its nutrition while cooking it.

In the low and middle income groups, the need for economy is found to be accentuated. Upper income consumers are, however, relatively more experimentative.

Fish curry and fry are the most common dishes across all groups:

— Fish curry is made with tamarind puree and *masala*; tomatoes and onions are optional.

— Fish is fried after marinating it in *masala* for about half an hour.

While low income consumers make only rice and *rasam* (mulligatawny) when fish is cooked, middle and upper income consumers cook vegetable dishes as well. Curd is seldom taken with fish.

Low and middle income consumers cook Prawn with potatoes or other vegetables to fill out the dish; this is partly because Prawn is expensive and partly because it reduces in size when cleaned. Upper income consumers make *korma* or *biryani* with Prawn; frying is also common.

Low income consumers cook fish in earthen pots, while the others use steel vessels.

Other sea food specialities are:

* Soup with Crab.
* *Korma* (using coconut) using Anchovy.
* *Vada, bajji, biryani,* chips, cutlets with Prawn as well as fish.
* Baked fish (upper income consumers only).
* A sweet dish made with crab.
* Shark *puttu* (flakes of steamed shark scrambled with onions and chillies).

12.9 *Consumption practices*

The consumption habits of some consumers are quite interesting. While fish is itself never stored (except occasionally in a refrigerator), fish preparations are felt to taste best the day after they are cooked. Further, since there are two or three days in a week when fish is never eaten, *viz.* Tuesdays, Fridays and Saturdays, due to religious sentiments, it was often cooked only on Sundays and Wednesdays as it could then be kept and eaten the next days, *i.e.*, Mondays and Thursdays. Fish is eaten in plenty in July and August, as there are few auspicious days during these months. On the other hand, fish is completely avoided during October, as there are many auspicious days when women fast. Due to logistical reasons, fish is consumed either for dinner or, when leftover, for breakfast, on weekdays, and for lunch, on Sundays.

Fish curried, fish fried

APPENDIX I

Names of fish

English (local)	*Tamil*	*English (general)*	*Scientific name*
Bream	*Sankara*	Threadfin Bream	*Nemipterus* spp.
Seer	*Vanjaram/Seela*	Spanish Mackerel	*Scomberomorus* spp.
Pomfret	*Vaval*	Pomfret	*Pampus* spp.
Prawn	*Eral/Eraa*	Shrimp	*Penaeus* spp.
Crab	*Nandu*	Crab	*Portunus* spp.
'Golden Fish'/Tilapia	*Thilaepia/Jilebi*	Tilapia	*Tilapia nilotica; T.mozambica*
Seaperch (Cock-up)	*Koduva*	Giant Seaperch	*Lates calcarifer*
Whitefish	*Sudumbu/Suthumbu*	Big-jawed Jumper/ Whitefish/False Trevally	*Lactarius lactarius*
Anchovy	*Nethili*	Whitebait	*Stolephorus* spp.
Mackerel	*Kanaan keluthi*	Indian Chub Mackerel	*Rastrelliger kanagurta*
Moustached Thryssa	*Poruva*	Moustached Anchovy	*Thryssa* spp.
Lizardfish	*Thumbili/Thanni Panna*	Greater Lizardfish	*Saurida tumbil*
Sardine	*Mathi*	Indian Oil Sardine	*Sardinella longiceps*
Goatfish	*Nagarai/Navarai*	Goatfish/Red Mullet	*Upeneus* spp.
Shark	*Sura*	Dog Shark/ Sharp-nosed Shark	*Scoliodon laticaudus*
Catfish	*Kelluthi/Kezhuthi*	Catfish	*Arius* spp.
Ribbonfish	*Valai/Vaalai*	Ribbonfish/Hairtail	*Trichiurus* spp.
Horse Mackerel/Carangids	*Parai/Paarai*	Trevally/Scad	*Caranx* spp.
Indian Salmon	*Kala/Kaala*	Threadfin	*Polynemus* spp.
Flatfish	*Naakumeen*	Sole	*Cynoglossus* spp.
Flatfish	*Adal*	Flounder	*Pseudorhombus* spp.
Ray	*Thirukkai*	Sting Ray	*Himantura* spp.
Eel	*Vilangu*	Eel/Moray	*Gymnothorax* spp.
Jewfish	*Kathalai*	Croaker/Jewfish	*Johnius* spp./*Johnieops* spp/ *Sciaena* spp.
Jewfish	*Panna*	Tiger-toothed Croaker	*Otolithes* spp.
Tuna	*Soorai*	Frigate Tuna/ Mackerel Tuna/ Skipjack Tuna	*Auxis* sp;*Euthynnus* sp. and *Katsuwonus* sp.
Silverbelly	*Karal/Kara podi* (small ones)	Ponyfish/Silverbelly	*Leiognathus* spp.
Perch	*Kilichan/Keeli/Keechan*	Tiger Perch	*Therapon* jarbua
Barracuda	*Goli/Gola/Oozha*	Barracuda/Seapike	*Sphyraena* spp.
Flyingfish	*Kola/Paravi Kola*	Flyingfish	*Cypselurus* sp./*Exocoetus* sp
Mullet	*Madavai*	Grey Mullet	*Mugil* spp.
Hilsa	*Ullam/Vengannai*	Indian Shad	*Hilsa* spp.
Mussel	*Aazhi/Matti*	Mussel	*Perna* spp.
Clam	*Kilinjal*	Clam	*Meretrix* spp.
FRESHWATER FISH — GANGETIC CARP INTRODUCED IN TAMIL NADU			
Catla	*Catla*	Bengal Carp	*Catla catla*
Rohu	*Rohu*	Bengal Carp	*Labeo rohita*
Mirgal	*Mirgal*	Bengal Carp	*Cirrihna mirgala*
FRESHWATER FISH — EXOTIC CARP INTRODUCED IN TAMIL NADU			
Common Carp	*Satha Kendai*	Scale Carp	*Cyprinus carpio*
Silver Carp	*Velli Kendai*	Silver Carp	*Hypophthalmytus molitris*
Grass carp	*Paasi Kendai*	Grass Carp	*Ptenopharyngodon idellus*

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Manuals and Guides (BOBP/MAG/...) which are instructional documents for specific audiences.

Information Documents (BOBP/INF/...) which are bibliographies and descriptive documents on the fisheries of member-countries in the region.

Newsletters (*Bay of Bengal News*) which are issued quarterly and which contain illustrated articles and features in non-technical style on BOBP work and related subjects.

Other publications which include books and other miscellaneous reports.

A list of publications in print follows. A complete list of publications is available on request.

Reports (BOBP/REP/...)

23. *Summary Report of BOBP Fishing Trials and Demersal Resources Studies in Sri Lanka.* (Madras, March 1986.)
24. *Fisherwomen's Activities in Bangladesh : A Participatory Approach to Development.* P Natpracha, (Madras, May 1986.)
25. *Attempts to Stimulate Development Activities in Fishing Communities in Adirampattinam, India.* P Natpracha, V L C Pietersz. (Madras, May 1986.)
26. *Report of the Tenth Meeting of the Advisory Committee.* Malé, Maldives. 17-18 February 1986. (Madras, April 1986.)
28. *Small-scale Aquaculture Development Project in South Thailand: Results and Impact.* E Drewes. (Madras, May 1986.)
29. *Towards Shared Learning: An Approach to Non-formal Adult Education for Marine Fisherfolk of Tamil Nadu, India.* L S Saraswathi and P Natpracha. (Madras, July 1986.)
30. *Summary Report of Fishing Trials with Large-mesh Driftnets in Bangladesh.* (Madras, May 1986.)
31. *In-service Training Programme for Marine Fisheries Extension Officers in Orissa, India.* U Tietze. (Madras, August 1986.)
32. *Bank Credit for Artisanal Marine Fisherfolk of Orissa, India.* U Tietze. (Madras, May 1987.)
33. *Non-formal Primary Education for Children of Marine Fisherfolk in Orissa, India.* U Tietze and Namita Ray. (Madras, December 1987.)
34. *The Coastal Set Bagnet Fishery of Bangladesh — Fishing Trials and Investigations.* S E Akerman. (Madras, November 1986.)
35. *Brackishwater Shrimp Culture Demonstration in Bangladesh.* M Karim. (Madras, December 1986.)
36. *Hilsa Investigations in Bangladesh.* (Colombo, June 1987.)
37. *High-Opening Bottom Trawling in Tamil Nadu, Gujarat and Orissa, India : A Summary of Effort and Impact* (Madras, February 1987).
38. *Report of the Eleventh Meeting of the Advisory Committee,* Bangkok, Thailand, March 26-28, 1987. (Madras, June 1987.)
39. *Investigations on the Mackerel and Scad Resources of the Malacca Straits.* (Colombo, December 1987).
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BOBP/WP/83

Post-Harvest Fisheries

BOBP
For Fisheries Development
BAY OF BENGAL PROGRAMME

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